ELECTRICAL WEST

OCTOBER, 1940

Take a Vacation from Cooking
Picnic Around Your Electric Roaster
Take a Permanent Vacation from Ironing Fatigue
FORECAST: Fair, September 13 to 29
Plug in to Easy Cooking
WITH AN ELECTRIC ROASTER
$27.95
$32.95
$22.95
$22.95
SEE THEM TODAY AT YOUR DEALER'S OR EDISON OFFICE
Let your next range be ELECTRIC
SOUTHERN CALIFORNIA EDISON COMPANY LTD.

★ Month after month Edison advertising goes into the 425,000 homes on Edison lines . . . promotes the use of electrical appliances wherever electricity can be used. A constant barrage of direct mail and newspaper advertising helps create good prospects . . . prepares the way for profitable appliance sales.

SOUTHERN CALIFORNIA Edison

10-40

ELECTRICAL WEST (with which is consolidated The Journal of Electricity), October, 1940. Vol. 85, No. 4. Published monthly by the McGraw-Hill Company of California, 68 Post Street, San Francisco, Calif. Entered as second class matter at the post office at San Francisco under the Act of March 3, 1879. Additional entry as second class matter at the post office at Los Angeles. Printed in U. S. A. Subscription rate in U. S. and U. S. possessions, and Canada, $2 per year; all other countries $3 gold (thirteen shillings). Single copy 25c
Copyright, 1940. McGraw-Hill Company of California.

VERSATOL INSULATED Cable

REG. U.S. PAT. OFF.

Has influenced the trend away from lead sheath toward the lower-priced nonmetallic cable

The unusually low water-absorption factor of Versatol—0.01 gram per sq in.—is the reason why this G-E cable seldom needs a lead sheath.

But it has other cost-saving features. The operating temperature is 75 C, which may allow a reduction in conductor size. The 504 hours in the oxygen bomb is said to approximate 50 years of natural aging, and that is evidence of long life and freedom from costly maintenance.

Thus, Versatol is economical.

These specifications, in brief, are the reasons why.

0.01 "The increase in weight . . . by the absorption of water . . . shall not be more than 0.01 gram per sq in."

75 C "The tensile strength . . . after 120 hours in the air oven at 121 C (250 F) . . . shall not be less than 1000 lb per sq in." This is comparable with a maximum allowable operating temperature of 75 C.

504 "The tensile strength . . . after 504 hours in the oxygen bomb . . . shall not be less than 75 per cent of the original value."

For more detailed specifications on Versatol insulated cable, see Bulletin GEA-2110. Or consult a G-E cable specialist. Address the nearest sales office or General Electric Company, Schenectady, N. Y.

Tellurium Parkway
(Shielded)

A POPULAR NONMETALLIC TYPE

This is one of the many types of Versatol insulated cable. It is a parkway type for direct burial and for other uses without ducts. The combination of Versatol (*for dielectric strength*) and tellurium-rubber sheath (*for mechanical protection*) forms a simple, nonmetallic cable that keeps down costs. It is low in price—lower than that of any metallic-armored cable. It is inexpensive to install—requires no stripping of lead or armor, no wiping of joints. It is light, flexible, and easy to handle. The tellurium-rubber sheath is tough and also resists moisture, soil acids, and alkalies. The cable will last.

You profit most when the insulated cable you select for each job is *always* the right one. To this end, make full use of G-E service and get the most for your cable dollar. Look to the *right* type for long-term economy.

GENERAL ELECTRIC

500-7

Here in the WEST

People

Howard Weber

is commercial engineer for The United States Rubber Co., wire products division, New York. An expert on wire and insulating materials, Weber has been an active participator on industry committees concerning adequate wiring.

His article in this issue is highly pertinent and time-

ly because of the new Code and the Underwriters approval of new thin wall wires.

Weber recently attended both the Southwestern and Northwestern section meetings of IAEI, where he outlined the new Code in detail and discussed numerous phases of it.

Homer C. Bender

is in charge of wiring promotion for The Washington

Water Power Co., handling contacts with electrical contractors. As secretary of the Adequate Wiring Assn., Spokane, he is active in contractors affairs in the state of Washington.

Bender has also written many papers on Adequate Wiring promotion for the Northwest Light & Power Assn. In these he has shown a sympathetic understanding on the subject of wiring, and has been a real factor in the increase in the proper wiring in new homes throughout the territory he covers.

A. A. Kroneberg

who furnishes us this month with a description of Barre substation, is the author of several articles in electrical publications.

He was born in 1899 in Russia, where his education included the equivalent of high school, four years of military academy and a year of university work. He came to the United States in 1923, and enrolled at Cal Tech where he graduated in electrical engineering in 1923.

His service with So. Cal Edison began in 1926, when he was hired as electrician at Long Beach steam station. His most recent promotion was to electrical engineer this year. He is a member of the AIEE and Tau Beta Pi.

Pages

What About These New Wires? 29
By HOWARD H. WEBER—Complete coverage on the special use of the new wires and cables.

Blitz Hits the Bureau 32
A factual review of the events leading up to the reorganization of the Los Angeles Bureau of Power & Light.

Wiring Makes the Headlines 40
By HOMER BENDER—Splendid cooperation on the part of business-wise publishers in the Northwest with the Spokane AW Bureau.

Adequate Wiring Homes Yields By-Products 42
The RMEL demonstration home in Denver produced some pleasant surprises for its sponsors.

Induction Heating for Coulee Gates 46
By RALPH D. GOODRICH, JR.—Big gates at Coulee need 215 kva. each to keep from freezing.

Barre Substation 49
By A. A. KRONEBERG—Details of So. Cal. Edison's second receiving unit for Boulder power.

New Products 4
Product Data 20
Scanning the Magazines 24
Electra's Husband 26
Sales Guide 35
Application Data 54
Associations 56
Rural 61
News of the Industry 64
Profiles 90

Preview

Keeping Harmonics Down

Many engineers will find a new slant on capacitor application problems next month, in an article by C. G. Smith, PG and E, based on his recent presentation before the Pacific Coast Electrical Assn. The article reports on harmonic investigations, probing the origins of harmonics on the system and

suggesting how they can be kept from exceeding desirable limits.

Assorted good reading for technical men will include outlines of two economical distribution substation designs and another of Mr. Kipp's articles on the development and application of relays.

Table Appliances

are to be highlighted in the coming November Sales Guide in ELECTRICAL WEST. A Christmas selling program

will be outlined and valuable sales hints offered.

Also featured in the November issue will be articles on outdoor Christmas lighting and table appliances.

HOW MUCH ARE YOU SPENDING *for Wattless Current?*

SMOOTHER REGULATION at lower cost is delivered by these Allis-Chalmers Step Regulators for a midwestern utility

Western Utility Finds How They Could Have Saved $150,000! Find Out How You Can Save Money with Allis-Chalmers Step Regulators . . . that Need Only About 1/3 the Exciting Current Required by Any Other Type of Single-Phase Low Voltage Regulator on the Market Today!

Like every other utility today you want to get efficient regulator operation at the lowest possible maintenance cost! And yet here's one really substantial item on the wrong side of the ledger that you may have overlooked — exciting current!

Here are the facts! Step-Type regulators take less exciting kva than other types of regulators— only about 1/3 the current! And Allis-Chalmers makes the only step-type regulator for single-phase low voltage feeders on the market today!

A typical example of the savings a large system could make using step regulators is that of the western utility that recently found how they could have saved $150,000.

Before step-type regulators had been developed, this utility installed a large number of regulators of the older type. These regulators required 30,000 kva for excitation ... step-type needed only 10,000. That difference of 20,000 kva required fixed capacitors costing about $150,000 to supply the reactive current!

But, even if fixed capacitors hadn't been used, that 20,000 needless kva meant an extra burden on the entire system ... and just to carry the costly load of wattless current!

Utilities Switch to Allis-Chalmers!

No wonder utilities all over the country are switching to Allis-Chalmers Step-Type Regulators! They know about the 5/8% Half-Cycling Steps that give smooth, almost stepless regulation . . . the extra large, non-arcing contacts that mean extra years of contact life!

Get the whole story on how you can cut your excitation losses . . . give better service with Allis-Chalmers Step-Type Feeder Voltage Regulators! Write for Bulletin 1183-A!

1042

INCREASE YOUR REVENUE WITH ALLIS-CHALMERS 5/8% HALF-CYCLING STEP REGULATORS

TRANSFORMER DIVISION

ALLIS-CHALMERS

MILWAUKEE-WISCONSIN

MEETS EVERY DEMAND . . . AT LOWER COST

The all-important tensile strength that steel alone provides . . . the ruggedness to withstand vigorous punishment . . . the ability to outlast normal needs . . . are combined to the highest degree in *Crapo* Galvanized Steel Strand.

Definite economies both in construction and maintenance are made possible by this time-tested product. Its comparatively low initial cost, its workability in the field and its consistently trouble-free performance in service are significant reasons for its selection by engineers for the more important construction jobs.

The extra-durability of *Crapo* Galvanized Steel Strand is directly traceable to its heavy, ductile, tightly-adherent zinc coating, applied by the *Crapo* Process of galvanizing, and to the care and precision of manufacture. Every size and grade of *Crapo* Steel Strand is produced from selected steel, uniformly processed and laboratory tested to insure close adherence to required standards.

Crapo Galvanized Steel Strand is readily available in all standard grades and sizes from representative jobbers throughout the country. Consult the distributor of *Crapo* Galvanized Products near you, or write direct for further information!

INDIANA STEEL & WIRE CO.
MUNCIE, INDIANA

NEW PRODUCTS

Midget Lamp (1001)

A new 6-watt Mazda fluorescent lamp only 9 in. long for use where space is limited and high lumen output is not required, has just been announced by the Westinghouse Lamp

Division. Selling for $1.15, it fills a need for a small, low wattage, economical fluorescent lamp, is available in two colors—daylight and white. The new lamp is expected to find applications in illuminating business machines, curved showcases and coves, airplane and ship cabins, niches, cabinets, mirrors, bed lamps, and paintings.

Insulation Former (1002)

A new insulation former manufactured by Ideal Commutator Dresser Co. forms either plain or cuffed insulation of any length and to 8 in. maximum width. It makes neat fitting and uniform slot linings to speed up winding and prevent burned out armatures caused by winding being torn when coils are tamped into place. The machine operates by turning a hand crank while insulation is accurately guided between a rubber roller and two cleansing rollers by two aluminum brackets. The rubber roller protects the insulation and prevents the creasing roller from cutting through. Any desired width of trough to 1½ in. may be obtained by adjusting the span between the two hardened steel creasing rollers. The creasing roller assembly is also adjustable for position of trough on insulation. Spring pressure between the rollers allows for different thicknesses of insulation.

O-B Stratelines (1003)

Expanding its line of special clamps for dead-ending bus conductors in stations or line conductors at towers, the Ohio Brass Co. has added a fourth and larger size. The three original clamps accommodated 0.28-0.43-in., 0.42-0.55-in. and 0.54-0.68-in. cables, respectively, while the new clamp is for 0.54-1.00-in. cables. Known as Stratelines, these clamps allow a cable to pass through the dead-ending device in a straight line. This design prevents twisting of wire and clamp, and clearances are greater than those afforded by usual dead-end clamps. Intermediate fittings are not necessary with cable buses because the clamp can be connected directly to a clevis-type suspension insulator.

STREAMLINE YOUR WORK!

Use

IDEAL "SNAP-TITE" SWITCHBOX SUPPORTS

Simplify installation of standard sectional switchboxes in composition walls — Celotex, Plaster Board, etc. Fastenings are all outside the box, easy to get at. No screws, no special tools. Inexpensive.

New

IDEAL "WIRE-NUTS"

Save material costs—eliminate tape and solder—and give you a safer, better wire joint. Just strip wires, screw on like a nut on a bolt—that's all.

IDEAL SOLD THROUGH JOBBERS

Electrical Products Division
IDEAL COMMUTATOR DRESSER COMPANY
1042 PARK AVENUE SYCAMORE, ILLINOIS

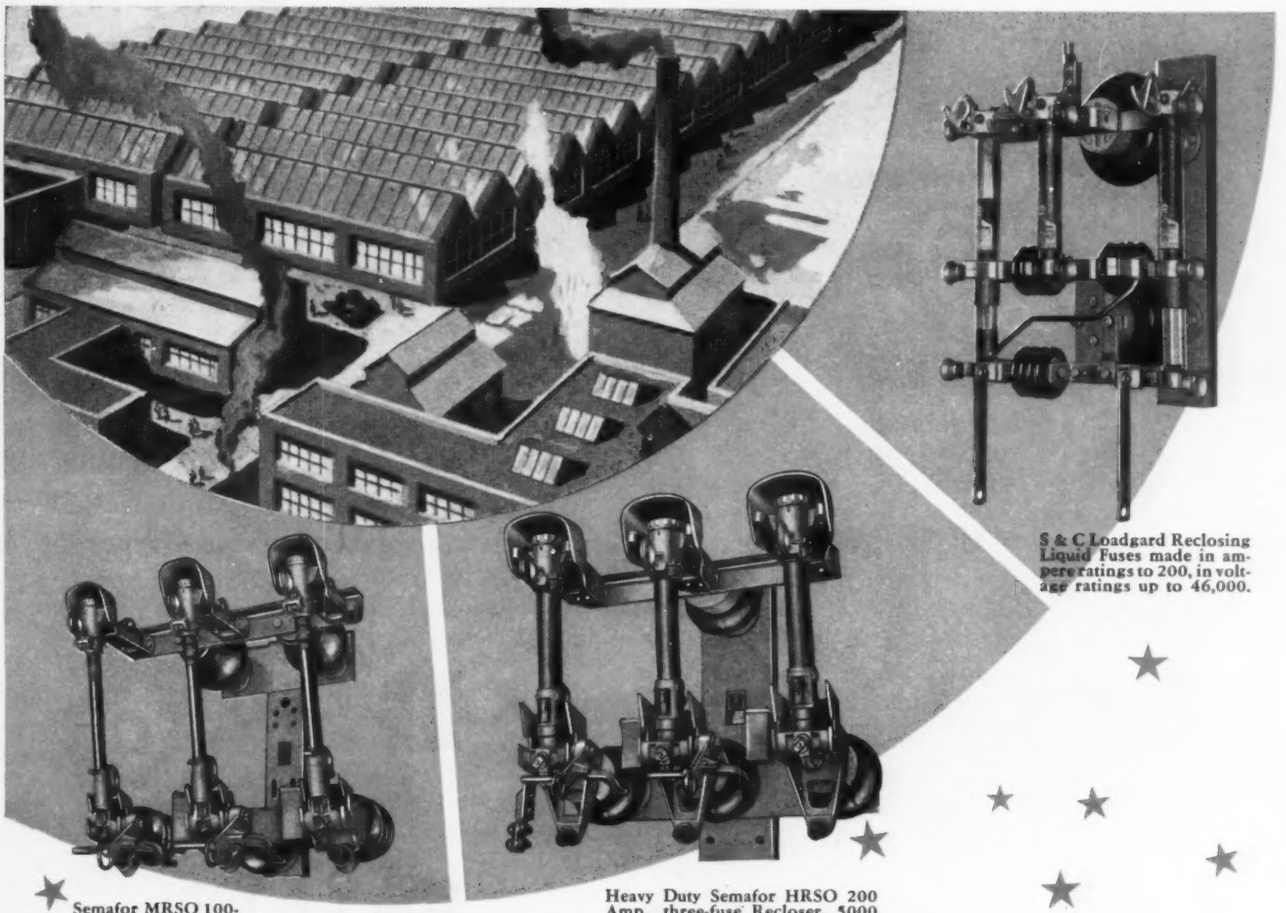
THERE ARE "BESTS" IN EVERY INDUSTRY

IN ELECTRICAL APPLIANCES IT'S

Sunbeam

Automatic **MIXMASTER**
Double Automatic **IRONMASTER**
SILENT AUTOMATIC TOASTER
Automatic **COFFEEMASTER**
SHAVEMASTER
FLAT TOASTER • FAN HEATER
GLASS COFFEE MAKERS
WET-PROOF HEATING PAD
MASTER PLUG & CORD SET

MADE AND GUARANTEED BY
CHICAGO FLEXIBLE SHAFT COMPANY
5600 West Roosevelt Road, Chicago, Illinois
316 Commercial Street, Los Angeles, Calif.
224 S. W. Temple Street, Salt Lake City, Utah
557 Market Street, San Francisco, Calif.
50 YEARS MAKING QUALITY PRODUCTS



S & C Loadgard Reclosing Liquid Fuses made in ampere ratings to 200, in voltage ratings up to 46,000.

Semafor MRSO 100-Ampere three-fuse Recloser, 5000 to 46,000 volts.—Uses Universal S & C Fuse Links.

Heavy Duty Semafor HRSO 200 Amp., three-fuse Recloser, 5000 to 46,000 Volts.—Uses field replaceable Fuse Units.

Armament Program Puts New Demands on Power Companies for Continuity of Service

S & C RECLOSERS ON INDUSTRIAL SUBSTATIONS REDUCE OUTAGES

Production delays will be more serious when our defense program gets under way. You can safeguard service continuity to big power customers by installing S & C Reclosing Fuse Equipment which re-establishes the circuit automatically after a fault occurs. Operating records show that a sizeable percentage of all faults are self-clearing. In such cases, there are only momentary outages. S&C Reclosers are made in various types and ratings up to 200 amperes, 46,000 volts, and with interrupting ratings up to *10,000 r.m.s. amperes.* There is a type and size to meet your requirements.

Now is the time to do *your* part to insure still greater degree of continuity of service for plants engaged on defense program work . . . Make a survey of your power customers and let us supply the details covering recommended Reclosing Equipment.

Typically S & C in thoroughness of design and construction, S & C Reclosers provide effective, reliable protection at low overall cost.

SCHWEITZER & CONRAD, INC.
4435 Ravenswood Ave., Chicago, Ill.
Manufactured in Canada by Powerlite Devices Ltd., Toronto, Ont.

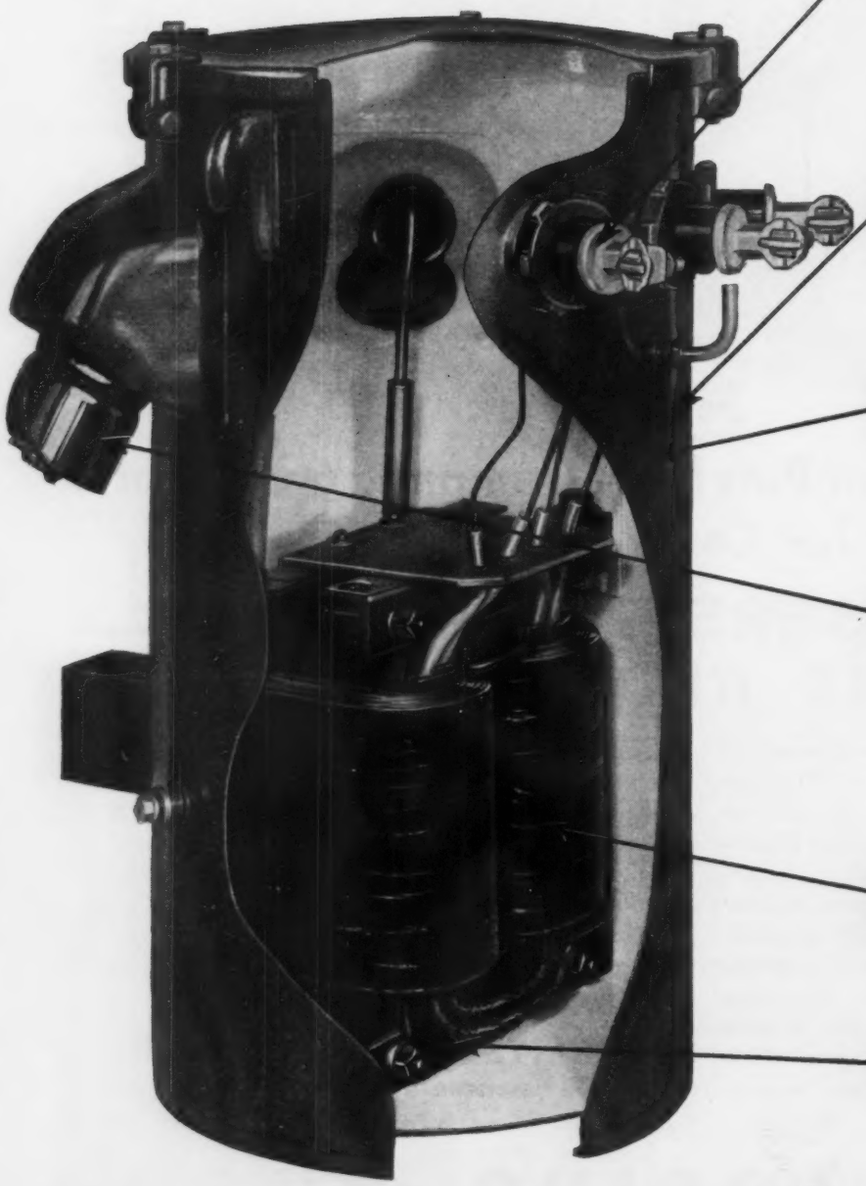
RECLOSING FUSE EQUIPMENT

WESTERN REPRESENTATIVES:

SAN FRANCISCO
George E. Honn, 420 Market Street
LOS ANGELES
Farnham & Cunningham, Edison Bldg.
SEATTLE
T. S. Wood, 220 Ninth Avenue, North
SALT LAKE CITY
Riter Engineering Co., Kearns Bldg.

Inside Facts on the New Allis-Chalmers Distribution Transformer!

SIX EXTRA VALUE



1. Revolutionary Cadmium-plated 3-Way Terminal Cuts Installation Time . . . Simplifies Wiring Job . . . Minimizes Electrolytic Action on Copper or Aluminum Conductors.

2. New, Durable Steel Tank, Tested Under Pressure . . . Prevents Oil Leakage . . . Assures Long Life.

3. New Spra-bonderizing . . . Plus Triple Coat Automobile Finish . . . Gives Positive 4-Way Rust Protection.

4. Extra-heavy Porcelain Coordinated Bushings with Liberal Creepage . . . Offer Maximum Reliability Under Fog, Dust, Chemical, or Other Adverse Operating Conditions.

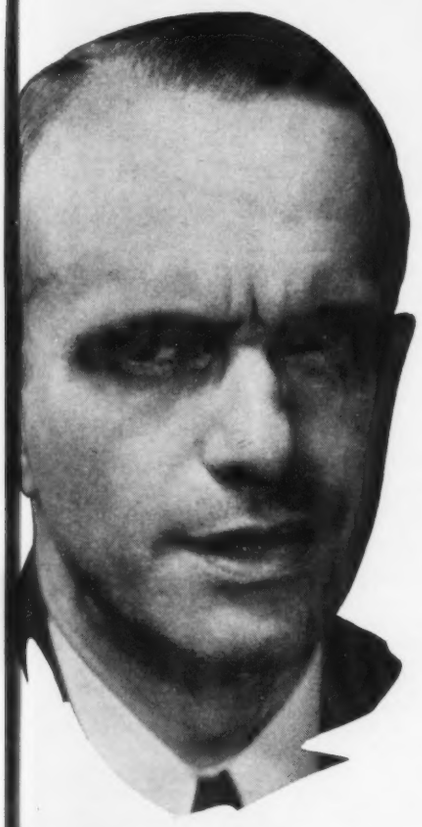
5. Double Conductor Insulation Provides Double Safety Against Winding Failures.

6. Time-proven Core and Coil Construction . . . Designed for Years of Efficient, Service-free Operation.

ALLIS-CHALMERS DISTRIBUTION

FEATURES AT NO EXTRA COST

Make Your Transformer Dollars Go Farther!



Six extra value features at no extra cost! Six big reasons why we sincerely believe you get more for your money when you buy the new Allis-Chalmers Distribution Transformer.

But we want you to decide that for yourself!

Inspect the big cadmium-plated 3-Way Terminals that take either aluminum or copper leads . . . eliminate costly wiring jobs . . . save you man hours. Then run your hand over the triple coat automobile finish of the husky steel tank. It's protected against rust and tested under pressure to eliminate oil leakage.

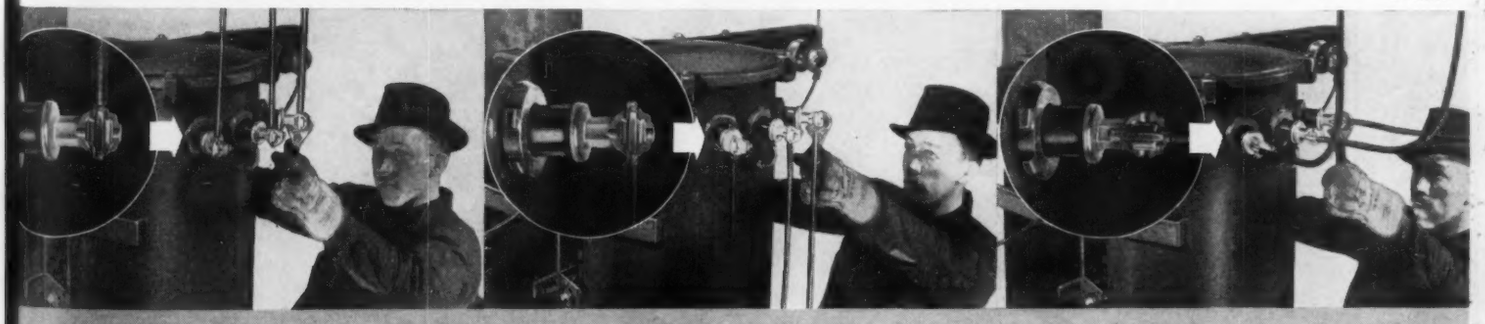
Take off the cover and check the core and coil construction. New perfection there is the result of more than 40 years of building distribution transformers for utilities all over the world. And all the windings are double insulated to give you *added* safety . . . *double* protection against winding failure.

Don't miss the extra heavy bushings with liberal creepage! They give you maximum reliability under adverse operating conditions . . . eliminate excessive voltage stresses and corona . . . reduce radio interference to a new low!

And here's the clincher! You get the new Allis-Chalmers Distribution Transformer . . . with all its extra value features . . . at a cost that's no more than you pay for ordinary transformers!

For the inside facts on all the other money saving features you get in the new Allis-Chalmers Distribution Transformer . . . call the district office near you. Or write for new Bulletin B-6096, Pittsburgh Works, Allis-Chalmers.

A-1263



SEE HOW THE NEW 3-WAY TERMINAL WORKS! First and second pictures show how simply and easily leads can be brought to the transformer from both top and bottom. But you don't stop there! For the third picture illustrates an ***extra*** advantage you get with no other terminal! If necessary, leads can be brought straight out from the transformer, without making an extra bend in the conductors or complicating the wiring job. Notice how the tightening tool travels in an ***up and down*** direction eliminating the chance for accidental shorts across the secondary terminals. Notice, too, that a standard lineman's wrench is used. No special tools are needed. You don't have to buy extra fittings. Heavy cadmium plating of the 3-Way Terminal makes it possible to be used with ***both*** copper and aluminum conductors with a minimum of electrolytic action.

TRANSFORMERS *Cut Operating Costs*

RUBBER COVERED POWER CABLE • BUILDING WIRE

CRESFLEX NON-METALLIC SHEATHED CABLE • SERVICE ENTRANCE CABLE • MAGNET WIRE • BARE WIRE

ARMORED CABLE • VARNISHED CAMBRIC • FLEXIBLE CORDS • LEAD ENCASED AND PARKWAY CABLES

CRESCENT

Makes a Complete Line of BUILDING WIRES and CABLES

A complete line for every wiring need, engineered and built for longer service and maximum performance even on the toughest assignments.

CRESCENT SUPPLIES

The following choices of insulation for standard building wires and cables:

Code Grade, Type R
30% Performance Grade, Type RP
ENDURITE Heat Resistant, Type RH
IMPERVEX Moisture Resisting Grade, Type RW
SYNTHOL Synthetic Insulated, Type SN

and here is a partial list of CRESCENT products:

Genuine A.B.C. Armored Bushed Cable
Flexible Steel Conduit
Bare Copper Wire and Cable
Flexible Cords
IMPERIAL Portable Cords and Cables
Parkway Cables
Rubber Power Cables
Service Cables
Signal and Control Cables
Trench Cables
Varnished Cambric Cables
Weatherproof Wires and Cables

CRESCENT INSULATED WIRE & CABLE CO. INC.
TRENTON, NEW JERSEY.

LOS ANGELES
Tri-State Supply Corp.
544 S. San Pedro St.

SAN FRANCISCO
Hodges & Glomb
1264 Folsom St.

KANSAS CITY
W. F. Howe & Co.,
2627 McGee St.

CRESCENT ENDURITE SUPER-AGING INSULATION

Shavemaster (1004)

Chicago Flexible Shaft Co., makers of the Sunbeam Shavemaster are introducing a new gift Shavemaster. The new model, catalogued as the "RG" Sunbeam Shavemaster, has a stunning gift display case, bound in the new rich, japonica leatherette with removable spool-cradle. The spool-cradle lifts out and the

cord is found on the spool below. Ends all cord-fumbling at home or on the road. The cradle can be used in any one of three convenient ways—left in the case, placed on a bathroom shelf, or hung on the wall.

Load Analyzer (1005)

The Knopp Load Analyzer is a portable instrument especially designed for making power factor and related measurements. It was developed by Electrical Facilities, Inc., in response to the demand for an instrument by means of which power factor measurements could be made quickly and accurately on individual loads such as fluorescent lighting equipment and neon signs. The Analyzer, because of its multirange feature, has a wide range which permits measurement of power factor, watts, and volts on loads of a few watts up to as high as 24,000—48,000 watts, depending upon the voltage range. It is available in five different models with eight current ranges from .5 to 100 amp. and potential ranges from 120 to 480 volts. Power factor measurements can be made from 10% lag to 85% lead. Wattages from 10 to 48,000 watts are read from a proportional linear scale by observing a unique stroboscopic disc.

"Statesman" Range (1006)

Taking advantage of its continuous program of engineering development to put into production a new medium-price electric range embodying 1941 features, the General Electric appliance and merchandise department, Bridgeport, Conn., has announced the immediate release, for fall markets, of the new "Statesman" electric range (model CDl-41). Because of its lighter weight, greater oven efficiency, fewer parts, and generally de luxe features—and because it carries a price distinctly lower than in the past for comparable equipment,—the new range will be made the object of intensive national sales activity beginning at once. A full complement of three 5-heat "Clean Speed" Calrod surface units, a fully automatic twin-unit oven, a new six-quart thrift cooker, no-stain vent, new metal-and-plastics hardware, glider base, lamp, and three large storage drawers are among the features of the "Statesman."

Are you set for your share ... of Holiday Sales?

This year, more than ever, the trend will be toward electrical gifts for the holiday season. For the new appliances are no longer just "practical" . . . they're handsomely styled for heart-warming giving. They get just as many excited "ahs" as anything else under the Christmas Tree.

The line of modern appliances distributed by GRAYBAR is jam-packed with eye appeal for buyers as well as recipients. Used for window-display, they'll attract new customers to your store. What's more, they're all items in which you can put your trust to *perform* as well as they look; each has the dual backing of a reputable manufacturer and the "satisfaction-insurance" of the GRAYBAR Tag.

For greater sales . . . for greater profits . . . better check with your GRAYBAR Representative today!

Executive offices:
Graybar Building, New York

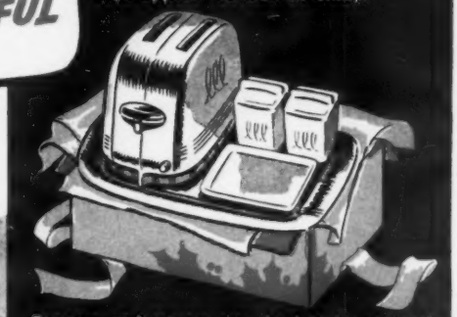
GraybaR QUALITY SINCE 1869

Distributed and guaranteed by

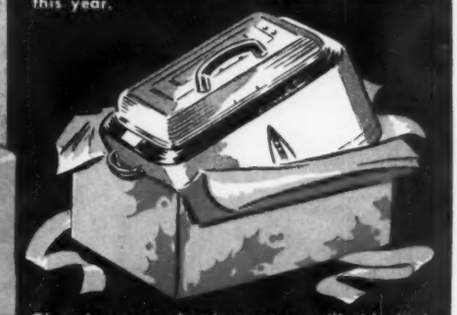
GraybaR ELECTRIC COMPANY

OFFICES IN MORE THAN 80 PRINCIPAL CITIES

Electric Clocks, Electric Irons styled for "eye appeal" as well as utility.



Toasters and toaster sets, backed by national advertising, will be more popular than ever this year.



Gleaming new electric roasters will ride high on the increasing trend to electric cooking.

The popular Cory glass coffee brewer with 2-heat electric stove will make more friends — more profits.

The Sunbeam Mixmaster, "fastest selling food mixer made", is sure to be a Christmas leader.

Easier for You

BANKING BY MAIL

For your own convenience, why don't you use our Bank-by-Mail Service? It's the simplest and easiest way to handle most banking details for your business and yourself. Overnight service to most points in California, and always as handy as the nearest mailbox. We invite you to open an account with us today, by mail.

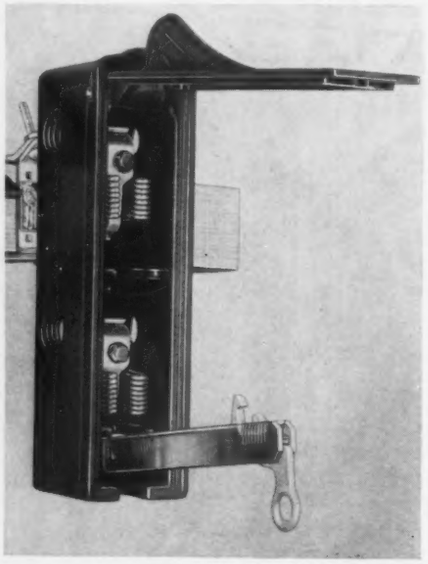
CROCKER FIRST NATIONAL BANK
OF SAN FRANCISCO
California's Oldest National Bank
Member Federal Deposit Insurance Corporation

Extra HOLDING POWER!

EVERSTICK ANCHORS...
Provide dependable anchoring when poles are subjected to unusual strains from storms. Made of tough, certified, rust resistant, malleable iron for extra strength and holding power.
Write for new bulletin
EVERSTICK ANCHOR CO.
FAIRFIELD, IOWA

Disconnect Stick (1007)

A hammer-type disconnect stick, that is proving very useful for "hammering open" switches whose blades have become stuck or corroded in the contacts, has been designed by James R. Kearney Corp. The disconnect hook travels approximately 1½ in. either from



a push or pull on the stick. At the end of this travel the hook strikes the ferrule with a sharp impact, opening the most stubborn switch blade. At the completion of the "push" or "pull" on the stick, a spring, enclosed in the ferrule, returns the hook to its original position.

Condensing Units (1008)

Refrigerating capacities have been increased approximately 25 per cent in the new line of commercial condensing units just announced by the air conditioning and commercial refrigeration department, General Electric Co. The new units are also easier to install, lighter in weight, and improved in appearance. The addition of 10 new types brings the complete line, including both air and water-cooled units, to 24 sizes ranging from one-quarter to 3 hp. The "commercial" line—from one-quarter to 3 hp.—is widely used for walk-in refrigerators, display cases, beer cooling, soda fountains, water and beverage cooling, florists refrigerators, mortuaries, and such low-temperature duty as frozen foods and ice cream. Capacity increases in the new line are attributed to refinements in engineering design, notably in a new valve and valve plate assembly and in the condensers.

Regulator (1009)

The Wagner type Y-H constant-current regulator, a compact unit assembly comprising the Regulator and Controller-Protector switch, is the latest development of the Wagner Electric Corp. It is said that it is the one regulator that has a supply current of unity power-factor when the load also has unity power-factor—and when the load has a lagging power-factor, the input current has a power-factor of approximately the same numerical value but leading. The regulator has no moving coils but operates from no load to full load, immediately adjusting its output voltage to varying load conditions without surges on the line or lamp circuit and is consequently adjusted instantaneously with changes in load. Due to the extremely low current-draw, the supply-line drop is very small.

Current Transformer (1010)

For high voltage metering applications, a new current transformer, which has reduced the height and weight of many sizes over 50 per cent without sacrificing performance, is introduced by Westinghouse. With current ratings of 5-10/5 to 500-1000/5 amp., the transformer may be used on circuits with voltages of 25 kv. and above. Smaller designs were made possible by enclosing the OPC current transformer in a porcelain shell, thus eliminating the need for a high-voltage bushing. This transformer has core type oil-immersed construction, with circular primary and secondary coils. A compensating winding, connected with the secondary, reduces the effect of leakage flux between the primary and secondary windings, giving high metering and overcurrent performance.

Delta-Star Switch (1011)

An innovation of the new "MK-39" Delta-Star k-v., 3000 amp. switch is the 4 in. square tubular blade, high pressure contacts at both ends being made across the corners of the tube; flexible leads are eliminated. The mechanical simplicity and ease of operation have captured the interest of operating men. There are only three moving parts, two of which constitute a 45 deg. bearing that turns the tube to break high pressure contacts before the blade swings open. Enclosed spiral springs counterbalance the blade structure.

G-E Clocks (1012)

A novel calendar clock and a barometer have been designed as two separate models in the new electric clock line for fall just announced by the General Electric appliance and merchandise department. Each provides unusual features in the field of electrical timekeeping in the home and office. The calendar clock, designated the "Almanac" (model 8H-14), and priced at $9.95, is an attractive and practical electric clock model which tells

not only the time of day but the day of the week and the date of the month. In a mahogany-finished wood case with gold-colored metal feet, the clock has a light cream dial, black numerals, and red day and date characters. The day and date appear in panels on the dial face. The clock stands 5¼ in. high, 6 in. wide.

SPLICE HIGH VOLTAGE CABLES WITH ---

OKOLITE HIGH VOLTAGE TAPE has been specially developed for splicing all rubber-insulated cables made with ozone-resisting compounds, and, particularly, for such cables operating at over 2000 volts between phases. Okolite High Voltage Tape for such purposes provides splices that will last as long as the cable itself. Write for further information.

THE OKONITE COMPANY

Founded 1878

EXECUTIVE OFFICE: PASSAIC, NEW JERSEY

HAZARD INSULATED WIRE WORKS DIVISION

THE OKONITE-CALLENDER CABLE CO., INC.

SALES OFFICES IN PRINCIPAL CITIES

OKONITE QUALITY CANNOT BE WRITTEN INTO A SPECIFICATION

for

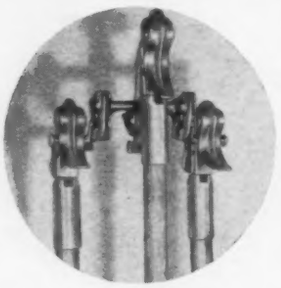
Superior Ozone Resistance
High Moisture-Resistance
High Dielectric Strength
Low Specific Inductive Capacity
Low Power Factor
High Insulation Resistance
Long Life

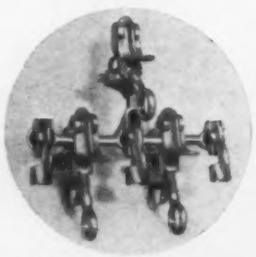
Other Okonite Splicing Materials include Okonite Rubber Tape, Manson Friction Tape and Okonite Rubber Cement.

"There's nothing too good where life is at stake"...

Protect linemen with TIPS grounding equipment...

POSITIVE CONTACTS





Linemen are entitled to the extra protection of Tips Grounding Equipment—originally designed to replace hazardous grounding chains that do not provide positive contacts.

Tips grounding sets clamp tight to the conductors and snap on quickly, eliminating the necessity of "feel" for the conductor and possible arcing in case the line should be accidentally energized.

Our new catalog of Tips maintenance equipment will show you a complete line of grounding sets like those pictured here. A set to meet every requirement and to fit every budget. Either mounted on poles or with eye screw clamps. Linemen will welcome your selection of this more positive grounding protection.

A·B·CHANCE CO. CENTRALIA MISSOURI

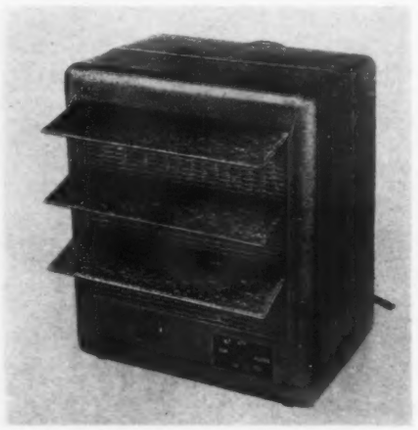
Adalets (1013)

Many branches of the electrical trade will be interested in the new Form 37 "Adalets" made by the Adalet Mfg. Co. They recognize that these conduit fittings are a radical improvement over the conventional types. The cross-section illustration shows the smooth curves on the inside of the fitting . . . the complete absence of right-angle turns that

crack and cut the insulation. There is no mechanical abrasion. The radii of the conduit hub bell-mouth curves is in accordance with the wire manufacturers' performance specification mandrel. The bell-mouth curve prevents sharp kinks in wires or cables on all right angle turns. In addition to the safety factor, this interior design speeds up the job by making it easier to pull the wires through.

Chromalox Heater (1014)

A HF unit heater (blower type) for domestic and industrial use has been introduced by Chromalox. Attractively finished steel heater case is provided with handle and rubber feet or pads for portable use. Brackets are available for permanent wall mounting. Adjustable louvres will direct air in desired direction. Chromalox Koilstrip elements within the heater warm air drawn in back of



heater and forced out the front by quiet, cadmium-plated fan. Enclosed type electric motor drives fan, without radio interference. Heaters are supplied for either 115 volts or 230 volts, 60 cycles, single-phase power supply, as specified.

Concentrator (1015)

To meet the need for a local floodlighting unit able to withstand severe vibration and resist deterioration from corrosive atmospheric vapors, Westinghouse has developed the "Tufflite Concentrator" a unit using either a 300- or 500-watt PS-40 Mazda lamp. These concentrators are ideal for use in railroad roundhouses, munition plants, electroplating plants, breweries, and around soaking pits, pickling vats and impregnating tanks. The complete unit consists of a copper housing, inner Alzak aluminum reflector, cast bronze socket housing assembly, swivel for ¾-in. conduit mounting, and a glass cover door assembly. All hardware is bronze or copper, nickel plated. The heat-resisting glass spread lens is held securely in place against a graphitized asbestos gasket by eight bronze spring clips fastened with machine screws.

L-M Test Lamp (1016)

A new test lamp, made by Line Material Co. gives new safety and efficiency in testing electric circuits, yet is remarkably low in cost. The lamp comes fitted for testing 110-volt and 220-volt circuits. It indicates 110 volt circuit by emitting a dim light, and a 220-volt circuit by burning brightly. The lamp can be furnished with higher rated bulbs for similar testing and indication of higher voltage circuits. The lamp is not recommended,

however, for testing of circuits over 600 volts. The lamp draws sufficient current to test meters. In construction, it is a modern version of the old lamp on cord tester. It consists of two small lamps screwed into a molded plastic base, and connected by 2-ft., well insulated flexible lead wires to pointed contact prods, which are protected by 5-in. fibre handles.

Westinghouse Cleaner (1017)

One of the housewife's most unpleasant tasks—emptying the dirt from her vacuum cleaner—is changed to a clean, simple operation by the special design of a new vacuum cleaner model presented by Westinghouse. "Easy-Empty" tabs on the bag of the new model, which is known as the "Captain," serve the double purpose of preventing dust from flying back into the room while the bag is being emptied, and eliminate the possibility of the metal clip on the top of the bag scratching polished furniture. The tabs act as a seal between the bag and the paper on which the contents of the bag are being emptied. The special large-mouth design of the bag, a heavy brown moleskin, also contributes to the ease of emptying. The Moldarta motor hood and the aluminum nozzle of the new streamlined model are finished in rich brown and tan.

THE Rockbestos Products Corporation of New Haven, Connecticut, presents Mr. Philip O. Weston, manager of its recently established Pacific Coast Sales Office, who is making his headquarters at 367 Ninth Street, San Francisco, in the offices of Marwood Ltd., the company's Pacific Coast Sales Agents.

Mr. Weston, formerly manager of the St. Louis Sales Office of Rockbestos Products Corporation, is a qualified engineer who has spent the past ten years in analyzing difficult wiring problems and recommending economical solutions through the use of Rockbestos permanently insulated wires. This cooperative service has given him a wide knowledge of the wire requirements of power companies, industrial plants, mines, steel mills, automotive manufacturers, railroads, aircraft manufacturers, appliance and equipment makers, and many others who have use for wire that is resistant to heat, flame, oil, grease, corrosive fumes, alkalies and moisture.

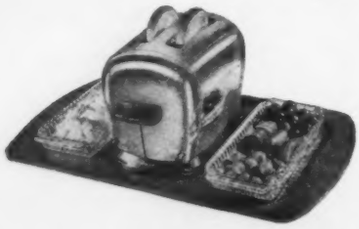
Perhaps this experience and engineering ability can help you reduce maintenance expense and improve service, or make your product more dependable. A letter or a phone call to any of the offices listed below will bring Mr. Weston without obligation, as he will be continually circulating in the territory covered by Marwood Ltd. Please feel that he is at YOUR service.

Marwood Ltd. 320 East Third St. Los Angeles, Calif.	Marwood Ltd. 367 Ninth St. San Francisco, Calif.	Marwood Ltd. 209 S. W. First Ave. Portland, Ore.	Marwood Ltd. 1714 First Ave. So. Seattle, Wash.

ROCKBESTOS—*the wire with permanent insulation*

Toastswell (1018)

A two-slice Toastswell, a super-silent automatic pop-out type toaster with an automatic split-second time control has been introduced by the Utility Electric Co. Illustrated is No. 222-T, the toaster and tray set with satin finish, genuine walnut tray that will not warp or stain. The two relish dished nest, forms a perfect refrigerator dish when not in use.



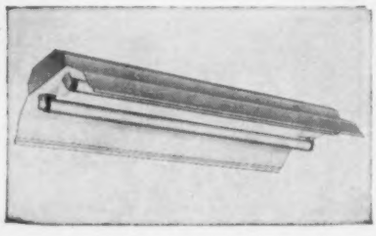
The Toastswell is guaranteed. It is ultra modern in design, having a chromium body supported by a black bakelite base. A selective pop-out feature enables one to raise the toast for inspection anytime during the toasting period.

Fuse Holder (1019)

A fuse holder now manufactured by the Alden Products Co. has the feature of mounting with either eyelets, rivets or screws to the panel and was developed after learning that the Underwriters objected to the ordinary nut mounting which was apt to loosen. It has contacts at the far end of the holder with a bronze clip with an internal spring which automatically ejects the fuse even though the glass may have been broken, and also gives more contact surface, affording lower resistance connection to the fuse. It is available either with a slotted top for a screw driver or with a knurled top which can be removed with the fingers for the purpose of replacing the fuse.

Twin-Lamp Luminaire (1020)

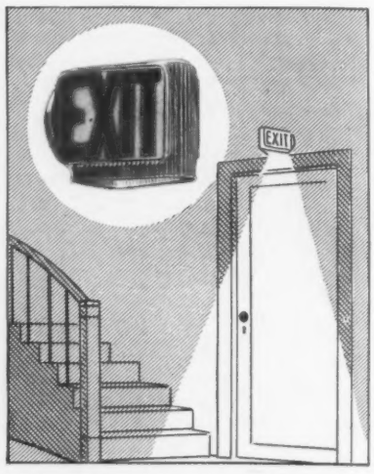
A new twin-lamp, open and fluorescent luminaire designed especially for general or supplementary continuous strip lighting in low bay industrial areas is announced by Westinghouse. These type FPC luminaires are available only in two lamp spread distribu-



tion style and utilize 2-40 watt, 48″ fluorescent lamps. Units consist of a hood, reflector, lamp holders, lamp starters, and ball as equipment. The hood is fabricated sheet steel and is hinged to the reflector to provide easy access for making line connections. The reflector is white porcelain-enameled steel giving a high over-all efficiency with cut-off at 72½ deg. from vertical.

Exit Globes (1021)

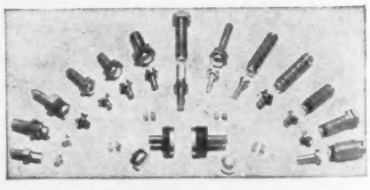
Kopp Glass, Inc., manufacturers of industrial, specialty and illuminating glassware, are introducing a new line of modernistically designed Exit Globes quite different in appearance from the conventional type globe. Instead of the electric bulb being totally enclosed, the bottom of this new Exit Globe (see illustra-



tion) is open and is designed in such a way as to throw a shaft of light on the door or step below. This arrangement has a decided safety advantage to persons using exits.

Contact Points (1022)

Metroloy Company Inc., is now manufacturing electrical contact points made from highly fused pure tungsten metal—assuring uniformity in grain structure, eliminating any excessive oxidization or pitting during operation periods. The purity of this metal avoids film coatings from adhering to contact surfaces during the time when apparatus is not operating or at shut-down intervals. It is



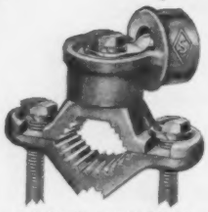
further found that due to elimination of these difficulties the electrical contact surface resistance is maintained at a minimum and that long service operation is assured.

Century Spot Light (1023)

A spotlight developed for the building industry to meet the needs of a beautiful lighting fixture as well as a highly effective utility spotlight has recently been put on the market by Century Lighting, Inc. A matte aluminum finished ball with a louvred ventilator surrounds the entire sphere and is part of the design. A directional track and focusing device allows the light rays to be aimed wherever desired, with a spread of 14° at spot position to 40° at flood position. All wiring is concealed. This unit can be provided for ceiling suspension or set on floor. Neat resisting glass color slides are also available.

FOR FAST INSTALLATION and POSITIVE CONTACT..USE

Sherman Ground Clamps



RIGID GROUND FITTING

Type GF2—solder or solderless fitting for rigid conduit. With soldering lug. Pipe clamp may be reversed for use with ground rod and thin wall conduit. A full size, heavy duty fitting.

STRAP TYPE PRE-FORMED EXCLUSIVE ROLLED END

Ground clamp of patented construction. Wire may be soldered to roll end, or clamped under washer. Made of pure copper, partially formed for easy installation.

Sherman Ground Clamps are uniformly easy to install, and insure positive contact. They are made of finest materials, on high production, precision machines which insure top quality at lowest cost.

It pays to stock and sell the Sherman line. With Sherman you can supply the right clamp for every job—and once you sell them you'll find they REPEAT.

"BONDROD"—*Today's Finest Ground Rod Clamp*

"Bondrod" ground rod clamp. Heavy extruded bronze. Bronze screw with cup point. Strong one-piece construction.

H. B. SHERMAN MFG. CO.
BATTLE CREEK, MICH.

You can have THE RIGHT LINK at the RIGHT PLACE at the RIGHT TIME

KEARNEY'S *Precision Built* FUSE LINKS

THERE are many reasons why so many operating men are using Kearney Fuse Links. Whether they specify the new Type 200, the Quik-Action Fitall or the Trip-O-Link Fuse, they find they get the dependability expected of a precision built link. With such factors as adaptability, strength, temperature, durability, accuracy and speed carefully considered in their design, these links assure efficient switch performance. And now ease of handling, storing and dispensing have been added to other features to give even greater value, at no extra cost.

features of the NO. 12165-B FUSE LINK DISPENSER

See from the ground whether you have links on the pole ready to handle an emergency. Pul Tabs of Kearney Fuse-Paks tell you.

Keep your fuse link coordination schedules accurate with a supply of proper amperage sizes right on the pole.

You might have the right link on your storeroom shelf, but why not have it at the point of use — in a pole-mounting fuse container?

Using KEARNEY FUSE LINK DISPENSERS

COMBINED WITH NEW PUL-TAB FUSE-PAK

At the right, the new Kearney Pul-Tab Fuse-Pak. Contains 5 fuse links, each packed in individual weather-resistant bags, each bag having a "pul-tab" clearly marked with amperage rating of link.

Above, the new Kearney Fuse Link carton for easier storeroom handling contains 5 Pul-Tab Fuse-Paks, 5 links to a Pak, 25 links to a carton. Each carton carries information on primary fuse sizes for distribution transformers.

NOW—minimize the risk of upsetting your fuse link coordination schedules—the hazards of over-fusing—unnecessary delays in restoring service. Assure these advantages by installing, right on the poles, at important switching locations, a Kearney Fuse Link Dispenser which is specially designed to hold a Pul-Tab Fuse-Pak containing five proper links.

After all, for convenience and emergencies, you want the right link at the right time, at the point of use—and reserve links, of course, on your storeroom shelves.

all Kearney Links packed in Pul-Tab Fuse-Paks

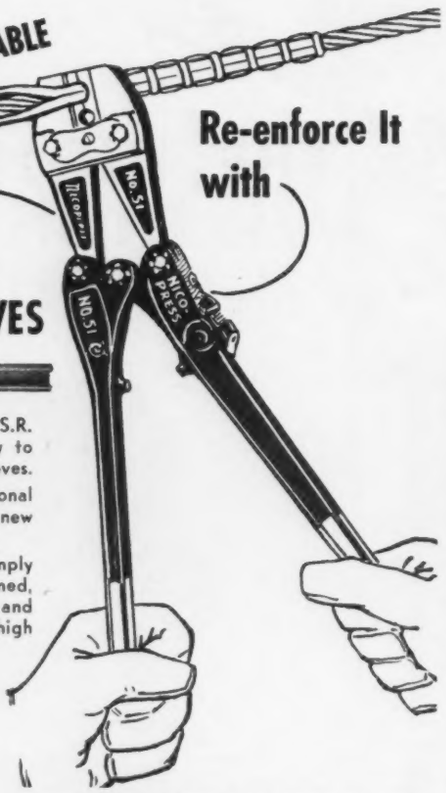
Whether or not you use the No. 12165-B Fuse Link Pole Dispensing Boxes which, incidentally, cost only 49c each, take advantage of the handy Pul-Tab Fuse-Paks and handy cartons of 25 links, the standard package for all Kearney Links, at no extra cost.

EXCLUSIVE SALES REPRESENTATIVES
MAYDWELL & HARTZELL INCORPORATED
LOS ANGELES • SAN FRANCISCO • PORTLAND • SEATTLE • PHOENIX • RENO • TACOMA • SPOKANE

SAVE
YOUR DAMAGED A.C.S.R. CABLE

Re-enforce It with

Nicopress
A. C. S. R. REPAIR SLEEVES



When one or more strands of your A.C.S.R. cable are broken, the best and fastest way to repair it is with Nicopress A.C.S.R. Repair Sleeves.

The work is quickly done—all need for additional cable is eliminated—and the time of making new splices saved.

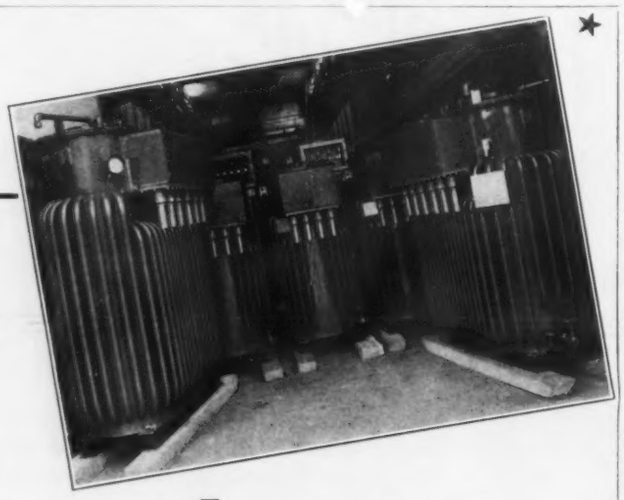
Nicopress A.C.S.R. Repair Sleeves are simply made, as shown by the illustration. Once formed, the completed splice is strong and tight and restores the A.C.S.R. cable to its normal high efficiency.

Order Nicopress from your jobber today. You'll save time and expense, no matter how much of this work you have to do.

THE NATIONAL TELEPHONE SUPPLY CO.
5100 Superior Ave., Cleveland, Ohio
Canadian Manufacturer—N. Slater Co., Ltd., Hamilton, Ont.
Export Distributor—International Standard Electric Corp., New York, N. Y.

SHIPPED to the "49th STATE"

16 Gardner Transformers



THE progressive Territory of Hawaii, now considering application to become the "49th State" of the United States, is maturing in other ways also. For the von Hamm-Young Co., Ltd., Honolulu, T.H., has just received 16 11,500 to 460/230 volt GARDNER Transformers with special tap arrangement.

Within and without the United States, Gardner Transformers are relied upon to give trouble-free operation with minimum maintenance expense.

Write for complete information on Gardner Transformers, built to YOUR order.

Gardner Electric Manufacturing Co.
4221 Hollis St. Emeryville, Calif.

MAYDWELL & HARTZELL
INCORPORATED
Engineers and Manufacturers' Representatives
SAN FRANCISCO - PORTLAND - LOS ANGELES - PHOENIX

Waffle Baker (1024)

A new Edison-Hotpoint waffle baker, aptly named the "Charm" from its attractive, modern, streamlined, functional design, is being introduced this fall with a unique new merchandising service, and at a new low price, by The Edison General Electric Appliance Co., Inc. The waffle baker itself consists of two standard seven-inch molds, each with its own independent, adjustable thermostatic control and triple use "Silent Waffle Salesman" light. This light acts first as a pilot, showing when the baker is "on"; second as an indicator showing both when the baker has reached

temperature and when it is time to remove the waffle, and third, as a flashing "Waffles" sign to attract customers' attention to this popular and profitable dish. The thermostatic temperature control, in conjunction with the "Waffles" light, adjusts baking time to the individual batter so accurately that it has been termed a robot "batter brain."

Spred Ray (1025)

Thermador Electrical Mfg. Co. now presents the Spred Ray Heater in several new styles and finishes. The manufacturer points out that this heater, because of its unusual design, projects its warming rays in a broad arc that fully encompasses the entire room. Since it is extremely light and compact, the Spred Ray is an unusually portable heater for home or office.

Connector (1026)

Recently developed by the Briegel Method Tool Co. a new type connector for conduits and tubing embodies a number of features to improve the speed, neatness and durability of all tubing connections. Connector construction is of fine sheet steel. Stronger and neater

connections will be facilitated by a larger shoulder, completely closing the knockout hole in the box, by a new, improved bonding-type lock nut and by lap seam construction.

90 MILES OF R.I.P.* WITHOUT ONE "KICK"

V. C. Price, distribution engineer of Iowa Southern Utilities, noise-proofed 90 miles of 2.3 and 6.9 kv distribution lines in Southern Iowa, with Westinghouse R.I.P. insulators, the exclusive "cure" for radio interference at the insulator. Results? Both Engineer Price and radio fans in this area are sold on R.I.P. treatment . . . with not a single complaint reported since this installation. Also, policy of Iowa Southern is now to avoid radio reception complaints with R.I.P. insulators on all new lines.

** The patented Westinghouse R.I.P. (Radio Interference Proof) glaze becomes a part of the insulator. There are no extra parts to install, replace or service. Write today for complete details of how R.I.P. Porcelain permanently does away with your radio interference troubles at the insulator. Westinghouse Electric & Manufacturing Company, Dept. 7-N, East Pittsburgh, Pa.*

R. I. P. PORCELAIN WINS APPROVAL OF INDUSTRY

Results like Iowa Southern's have caused operating companies with one-third the total U. S. generating capacity to approve and install Westinghouse R.I.P. insulators in one short year.

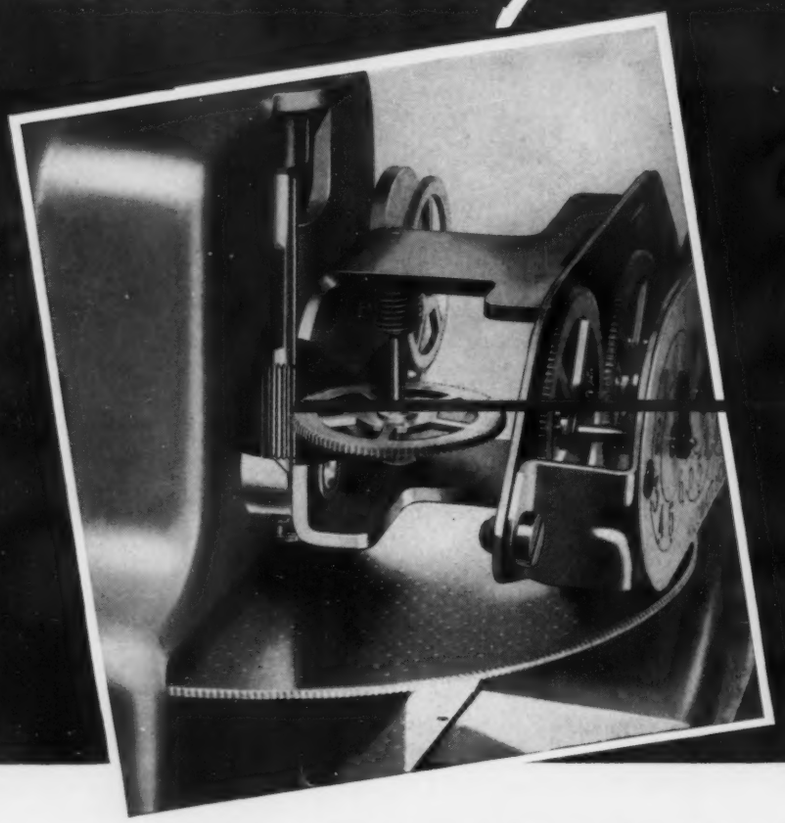
J-05112

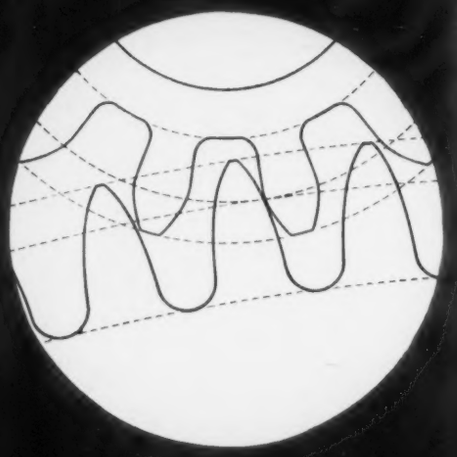
Westinghouse Porcelain

W WESTINGHOUSE ELECTRIC

EXACT MESH

Never too Tight... Never too Loose

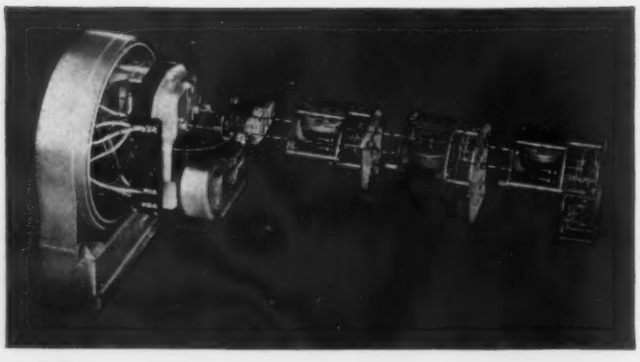




WHERE LONG TIME METER ACCURACY COMES FROM

First, the gears in a Westinghouse Meter are all milled gears, carefully machined to produce perfectly shaped involute teeth that roll over each other with a minimum of friction.

Then, so precise is the control of all dimensions in the meter that correct mesh is assured between the first register gear and the moving element pinion. No adjustments—no "making them fit." Anybody can remove and replace a Westinghouse Meter register and get factory adjustment—instantly.



Each register is gold finished, to guard against corrosion from moisture, vapor or any other cause.

As a result, the meter is never slowed down by register friction. Accuracy continues year after year. Even periodic maintenance may be much longer deferred.

And the purpose of all this extra precision work is to permit more accurate metering at lower cost per year!

ALL TYPES OF REGISTERS ARE INTERCHANGEABLE—AND ALWAYS FIT

Not only do the standard kilowatt hour registers fit but also demand and time switch registers fit interchangeably, without adapters or adjustments.

Call your Westinghouse Office or address Westinghouse Elec. & Mfg. Co., Dept. 7-N, East Pittsburgh, Pa.

J-40263

Westinghouse Meters

The NEW CHROMALOX Super-Speed RANGE UNIT

Combines ECONOMY with SPEED

MORE COOKING PER DOLLAR

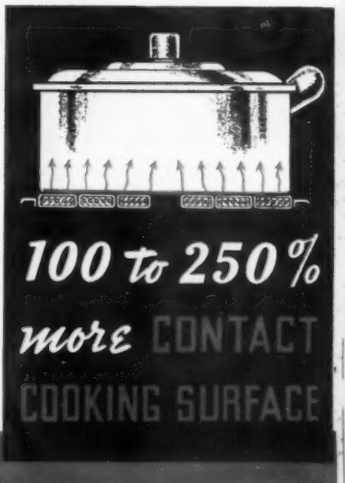
means more electric cooking, more range sales

Chromalox **contact cooking** does it. All the heat flows straight to the utensil, without deflection or heat-resisting air space. **100 to 250 percent greater contact surface** than any other metal-encased unit, gives Chromalox units a sales advantage that gets instant response from every thrifty housewife.

Add to this the further economy of **"Two-Units-in-One"** which provides rings of heat sized to fit any pot or pan . . . point out the **ease of cleaning** the all-flat top (no need to lift unit from range) . . . drive home the uniform cooking results of six heats that eliminate all guesswork . . . **Sell electric cooking with ranges equipped with Chromalox units, and you'll sell more ranges.**

"HOW TO SELL MORE RANGES"—Dealers everywhere are asking for it. Free to you, upon request on your business letterhead.

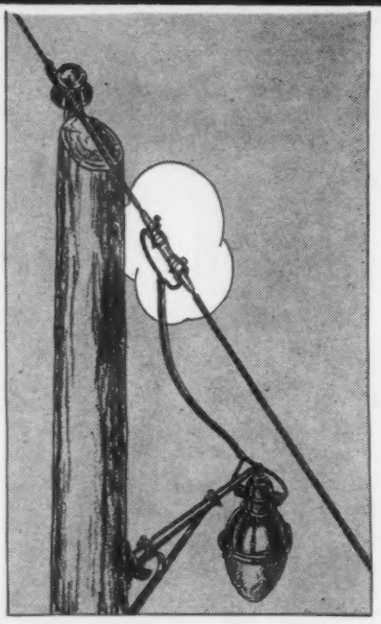
EDWIN L. WIEGAND CO., 7540 Thomas Blvd., Pittsburgh, Pa.



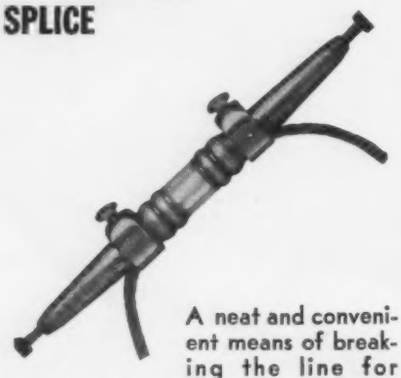
Write us or our nearest representative:

MONTGOMERY BROTHERS—911 Western Ave., Seattle, Wash. • 1501 N. W. Kearny St., Portland, Ore. • 61 Fremont St., San Francisco, Cal. • 420 S. San Pedro St., Los Angeles, Cal.

modernize
YOUR
DISTRIBUTION
PRACTICE—



RELIABLE INSULATED
STRAIGHTLINE
SPLICE



A neat and convenient means of breaking the line for series street lighting, for secondary banking, for sectionalizing. Will develop full line wire strength and may be installed on existing construction without splicing in an extra length of wire.

Insulating section is a tough and strong plastic with high dielectric strength which will not carbonize nor absorb moisture.

Reliable
ELECTRIC COMPANY
OVER 25 YEARS SERVICE TO THE UTILITIES
3145 CARROLL AVENUE CHICAGO ILL.

PRODUCT DATA

Handbook (1027)

A Hazakrome Handbook dealing with Type SN small diameter building wire for rewiring existing raceways has been issued by the Hazard Insulated Wire Works. This complete 32-page booklet lists engineering data including wiring tables, case histories of actual installations, and an analysis of the market and suggestions for developing it. Contractors, wholesalers, consulting engineers, electricians and maintenance men will find it extremely valuable in laying out plans for rewiring—from every angle—selling, estimating or actual design.

Ilg Heater (1028)

What Happens in the Vital Zone, where people work and play? asks the Ilg Electric Ventilating Co. in a new publication just issued. The advantages and features of the Ilg unit heater are outlined simply, savings are noted, and the Ilg motor discussed. Other details given include the description of a two-piece heater, and illustrations of various tests conducted on this type of heater.

Safecote Wire (1029)

A 36-page booklet has been issued by National Electric Products Corp. on its National "Dilec" Safecote Wire. The book has been carefully written by company wire and electrical engineers, using all information available after obtaining authoritative interpretation of code changes. It is informative, but it is not a technician's guide book, nor a handbook. Numerous tables and illustrations explain Safecote Wire, new types of building wire recognized by the 1940 National Electrical Code, etc.

Power Transformer (1030)

Allis-Chalmers Mfg. Co. have a new 16-page bulletin on their high voltage power transformers. It thoroughly illustrates and describes fourteen design features available in their latest large power transformers.

Air Conditioning (1031)

Complete instructions for the selection of direct-expansion cooling coils needed to meet the full range of summer air conditioning requirements are contained in a new 36-page booklet now available from the air conditioning and commercial refrigeration department, General Electric Co. The booklet describes such design features as the "Electro Thermal Bond" between copper fins and tubing, and explains in detail two simplified methods of coil selection—the "Exact Selection Method" by which coil surface is calculated by engineering formulae, and the "Selected Performance Method" which consists of pre-calculated performance tables. In the back of the booklet are engineering and application data, including a full-size psychometric chart.

Circuit Breakers (1032)

Circuit breakers is the subject of a catalog, No. 40, just published by the Heinemann ("Re-Cirk-It") Circuit Breaker Co. Magnetic breakers, time delay and instantaneous types are included in this 36-page bulletin. Illustrations of each unit are offered, with details of construction, installation and maintenance.

Carrier Catalog (1033)

Adaptability of air conditioning to industry is amply illustrated in a new 16-page catalog by the Carrier Corp. Complete equipment is shown, from a window ventilator handling a few hundred c.f.m. to heat diffusers delivering b.t.u in hundreds of thousands. Self-contained room coolers for individual spaces and central station installations handling thousands of c.f.m. are also listed.

Distribution Systems (1034)

Flexible light and power circuits for industrial plants and commercial buildings is described in a 46-page booklet published by Bull Dog Electric Products, Inc. This book describes a modern, flexible electrical distribution system. It explains how new circuits may be added to the system at any time, or old circuits quickly and easily moved to new machine locations. Many diagrams and dimensional data sheets are presented together with numerous installation pictures.

Oil Circuit Breakers (1035)

Allis-Chalmers Mfg. Co., Boston Works, has just issued two new bulletins on quick clearing frame mounted high voltage oil circuit breakers for outdoor service. Bulletin B-6003 illustrates and describes the company's very large units available in standard ampere and interrupting capacity ratings from 15 kv. to 69 kv. Bulletin B-6093 covers small units in standard ratings from 15 kv. to 23 kv. Both of these bulletins are well illustrated and fully cover the distinctive features of design which include quick quench ruptors, high speed solenoid operator and accessible control cabinet.

Pressure Control (1036)

Pressure reducing and desuperheating control of the air operated type is illustrated and explained in a new bulletin No. 107-A issued by Bailey Meter Co. The bulletin includes diagrammatic arrangements, installation photographs and detailed photos of individual control units. Chart records show the operation of typical Bailey pressure reducing and desuperheating systems. A partial list of installations includes pertinent data for each application listed.

Bus Fitting (1037)

Safe Bus Fittings are discussed in a new bulletin issued by the Pacific Electric Mfg. Corp. Its twelve pages explain and illustrate the manufacture of bus fittings from the pattern to the finished product. Cross section diagrams show power connectors, bus connectors and supports in excellent detail.

In mines, factories, and mills, on the highways and the seas, in fact, for almost every type of American Industry,

Shell's Safety Factors are increasing lubrication efficiency and lowering operation costs.

These Safety Factors are tangible, extra values that are built into Shell industrial lubricants and service. They are something it will pay you to investigate. Phone local Shell office. A representative will be glad to explain their meaning – and the specific economies they can provide your operation.

SHELL

Panel Instruments (1038)

A 12-page illustrated catalog covering the "37" line of miniature panel instruments is announced by Westinghouse. These small instruments, approximately 4½ in. in diameter, and available in three mounting styles have a broad field of application; from industrial and radio test apparatus down to the gadget of the amateur experimenter. The catalog explains features such a dial readability, linear scales, interchangeability of instruments, and numerous others. Operating principles are described and illustrations of the instruments, both individual and installed, are included. Dimension and mounting data are given.

ECONOMICAL

Jeffries Transformers

Reasonable in Price
Reliable in Performance

Jeffries large transformers are priced reasonably—and you can save their first cost in a short time by minimizing current losses. When you use a Jeffries transformer, you can provide voltage change at the point desired, without prohibitive expense.

We supply all types and sizes. If not in stock, we build to order in a hurry—a week to 10 days.

Write today for catalog

JEFFRIES TRANSFORMER COMPANY

1710 E. 57th St. Los Angeles, Calif.

Voltage Regulators (1039)

A bulletin, B-6065, has been released by Allis-Chalmers Mfg. Co., giving the latest information on their transformer type of distribution feeder voltage regulators. It describes the construction, operating characteristics and advantages of this modern type of equipment and gives engineering and price information on a wide range of sizes for 2400, 4800 and 6900 volts.

Air-Cooled Transformers (1040)

Bulletin 401-PCT published by the Jefferson Electric Co., is devoted to power circuit air-cooled transformers. Illustrations of the various types are shown as well as suggestions for applications, winding diagrams, and specification and dimension tables. The sizes referred to are from .05 to 15 kva. in the double wound type and .1 to 25 kva. in the auto transformer type.

Engine Indicators (1041)

Premax adapters, engine indicators and Fyrite CO_2 indicators are discussed in three separate folders recently published by the Bacharach Industrial Instrument Co. These publications are well illustrated, advantages high-lighted, cross-section diagrams, details of manufacture and installations given.

Load-Center Distribution (1042)

Ways to Save with load-center distribution is the title of a new bulletin published by General Electric. This folder explains load-center distribution, its advantages, illustrates with simple charts and diagrams how money can be saved on proper location of transformers, how existing facilities can be modernized, the use of Pyranol, and actual illustrations of savings in the making.

Enclosed Switches (1043)

Bulletins No. 59 and 60 have just been presented by the Frank Adam Electric Co., the first publication dealing with Shutlbrak enclosed switches, and the second with service equipment, load centers and panelboards assembled with Type AC circuit breakers. Complete details of this equipment together with illustrations, cross-sections are given.

Condenser Bushings (1044)

A colored and illustrated folder telling the story of condenser bushings for transformers, circuit breakers, and other substation apparatus has just been published by Westinghouse. Advantages of the condenser bushing are explained, a cutaway cross sectional drawing serving to illustrate the points brought out. Such recent improvements as the "shock-absorber" action, and the new plastic filler material used in the bushing are fully discussed. Sketches show the positive seal incorporated in the bushing cap, illustrating how it performs a difficult job.

Mazda Lamps (1045)

Profitable production tools, Mazda H (mercury) Lamps is the subject of a new G-E bulletin which tells the story of these units, "a natural for industrial high-bay lighting." Better production, better working conditions, better business are claimed through the many advantages of these lamps. Mercury plus filament combinations and luminaires for Mazda H lamps are also discussed.

Fluorescent Controls (1046)

A four-page illustrated folder describing and listing the complete standard line of fluorescent lamp controls, ballasts, and capacitors for both single and multiple lamp luminaires is presented by Westinghouse. The function of controls and ballasts in the operation of fluorescent lamps is detailed, and a follow-through of their operation given. Hints on how to mount units, what ballast to use, how to correct power factor of lamps, and many others are presented. Typical single and double-lamp units are illustrated. The last two pages contain a complete listing of the standard single and double lamp ballasts, capacitors, compensators, and ballast units with built-in power factor correction. Also listed are controls for direct current operation of fluorescent lamps. Dimensions of all listed units are included.

Better Wiring (1047)

"Twenty-five per cent savings and the customer gets a better wiring job," is the title of a compact folder recently issued by Porcelain Products, Inc. In it is a story of dollars and cents savings through the use of porcelain outlet boxes. Actual figures tend to prove the additional savings as stated.

SAVE TIME! USE THIS COUPON

To keep posted, simply circle the items in which you are interested, cut out the coupon (it can be pasted on the back of a postcard) and mail to:

ELECTRICAL WEST, 68 Post St., San Francisco, California
Please send me the following CIRCLED items:

1001	1002	1003	1004	1005	1006	1007	1008	1009
1010	1011	1012	1013	1014	1015	1016	1017	1018
1019	1020	1021	1022	1023	1024	1025	1026	1027
1028	1029	1030	1031	1032	1033	1034	1035	1036
1037	1038	1039	1040	1041	1042	1043	1044	1045
1046	1047							

Name ..... Title* .....

Company* .....

Address .....

* Please include your company's name and your position, as we cannot ask manufacturers to furnish literature unless you do.

Four G-E PUBLICATIONS TO HELP YOU SELL and INSTALL ADEQUATE WIRING

HERE'S HELP FOR YOU!

Here's help for you! Three different factual handbooks—one on adequate industrial wiring; one on adequate residential wiring; and one on adequate farm wiring. Suggestions given in the industrial wiring handbook for modern wiring, apply with equal force to the wiring of commercial buildings.

Here also is a sprightly cartoon-filled booklet for you to give to your house wiring prospects. It will convince them of the importance of adequate wiring.

The handbooks will help you formulate effective sales talks and will serve as guides in the actual design and installation of adequate wiring. Modern wiring practices are outlined which can be adopted in your present jobs. Moreover, in each handbook there is a chapter describing G-E wiring materials—conduit, wire and cable and wiring devices—which will help in selecting materials and in writing material specifications.

ADEQUATE WIRING SERVES AND SAVES

To obtain a copy of any one of these publications, or all of them, see the nearest General Electric Merchandise Distributor or mail the coupon below.

General Electric Company
Section CDW-0230
Appliance and Merchandise Dept.
Bridgeport, Connecticut

Sirs: Please send me without obligation the following publications:

( ) Adequate Wiring for Industry
( ) G-E Home Wiring Handbook
( ) Farm Wiring Handbook
( ) The Poor Wife's Revenge

Name.....

Firm..... *Address*.....

City..... *State*.....

GENERAL ELECTRIC

The MOST COMPLETE LINE OF Service Connectors

LARGEST VARIETY of types, and a COMPLETE range of sizes. For all kinds of conductors.

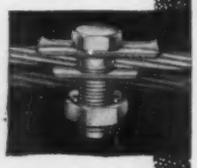
Popular connector at left is carried in stock in ALL sizes, up to 1,000,000 CM. Furnished with or without retainer.

ANY MATERIAL — Hardware Bronze, Silicon Bronze, Aluminum.

MILLIONS IN USE and never one rejection due to performance or workmanship. Can be re-used over and over.

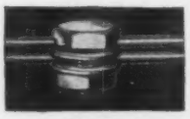
MADE IN OUR OWN PLANT under engineering supervision. Bodies and nuts precision machine-threaded for perfect fit. No sharp edges.

ALUMINUM Connectors machined from hard drawn rod, with forged spacers.



SERVICE POST Connectors for one or more conductors; many types.

SERVICE ENTRANCE Connectors with extruded copper bodies, Everdur screws.



TELEPHONE Service Connectors, brass rod—plain, nickel plated or tinned.

And THOUSANDS more—write for Catalog.

NICHOLAS & COOK
1063 HOWARD STREET
SAN FRANCISCO

NORTHWESTERN AGENCIES
2411 FIRST AVE.
SEATTLE, WASH.

PENN-UNION ELECTRIC CORP., Erie, Pa.

PENN-UNION Conductor Fittings

SCANNING THE MAGAZINES

Fluorescent Home Application

"Fluorescent Lamp Application in the Homes," by Myrtle Fahsbender and Richard G. Slauer, ILLUMINATING ENGINEERING, September, p. 669.—Questions as to possible application of this new light source in the home are ably answered by these authors who have made a study of fluorescent lamp installations in private families of varying incomes.

Scheduling System Growth

"Power System Planning—Chicago Style," ALLIS-CHALMERS' ELECTRICAL REVIEW, September, p. 5—Describing in detail how the Commonwealth Edison Company of Chicago utilizes a system planning division to eliminate haphazard methods in planning for future load.

Home Lighting

General Electric's "MAGAZINE OF LIGHT," Number 6, surveys the home lighting field, discusses light sensitivities, fixtures, portable lamps, architectural lighting elements, and concludes with a complete reference section devoted to wiring, types of Mazda lamps.

The Industry

"After Hours," by P. H. Erbes, Jr., PRINTER'S INK, Sept. 6, p. 6.—Editorialized comment on what would happen should the electrical industry fail to function one day.

National Defense

"TVA Hydro Power Flunks Defense Test," by David J. Guy, NATION'S BUSINESS, September, p. 17.—How by-product water power fails to meet the demands for stepped-up production during the national crisis.

Appliance Retailing

"The Cost of Retailing Appliances," by Ernest C. Hastings, ELECTRICAL MERCHANDISING, September, p. 10.—A survey of 24 appliance dealers figures shows the total cost of 33.1% of retail value.

Rural Sales

"The Royal Road to Farm Appliance Sales," ELECTRICAL MERCHANDISING, September, p. 12.—An interview with a home management specialist reveals what farmers want and how they should be sold.

Home Light Conditioning

"The Tale of a Lighting Bug," by Phyllis Hayden, McCALL'S, October, p. 97.—Jingles about a lighting bug, shaped like a lamp bulb, which give advice on home light conditioning.

Lighting Show

"First National Lighting Show in Print," staged by WHOLESALER'S SALESMAN, September, p. 21.—A "show" to focus attention of wholesalers everywhere on the tremendous sales opportunities that exist in the lighting field. These editorial "exhibits" cover everything from sun lamps to fluorescent units.

FOR SALE: Going electrical contracting business with retail radio and electric store, for sale. Completely equipped. Sonoma County, California. Approximately $5,000. Deal with owner. Box 201, Electrical West, 68 Post St., San Francisco, Calif.

ELECTRICAL TESTING LABORATORIES
Electrical Photometrical, Chemical and Mechanical Tests. Inspection of Materials and Apparatus at Manufactory.
2 East End Ave. New York

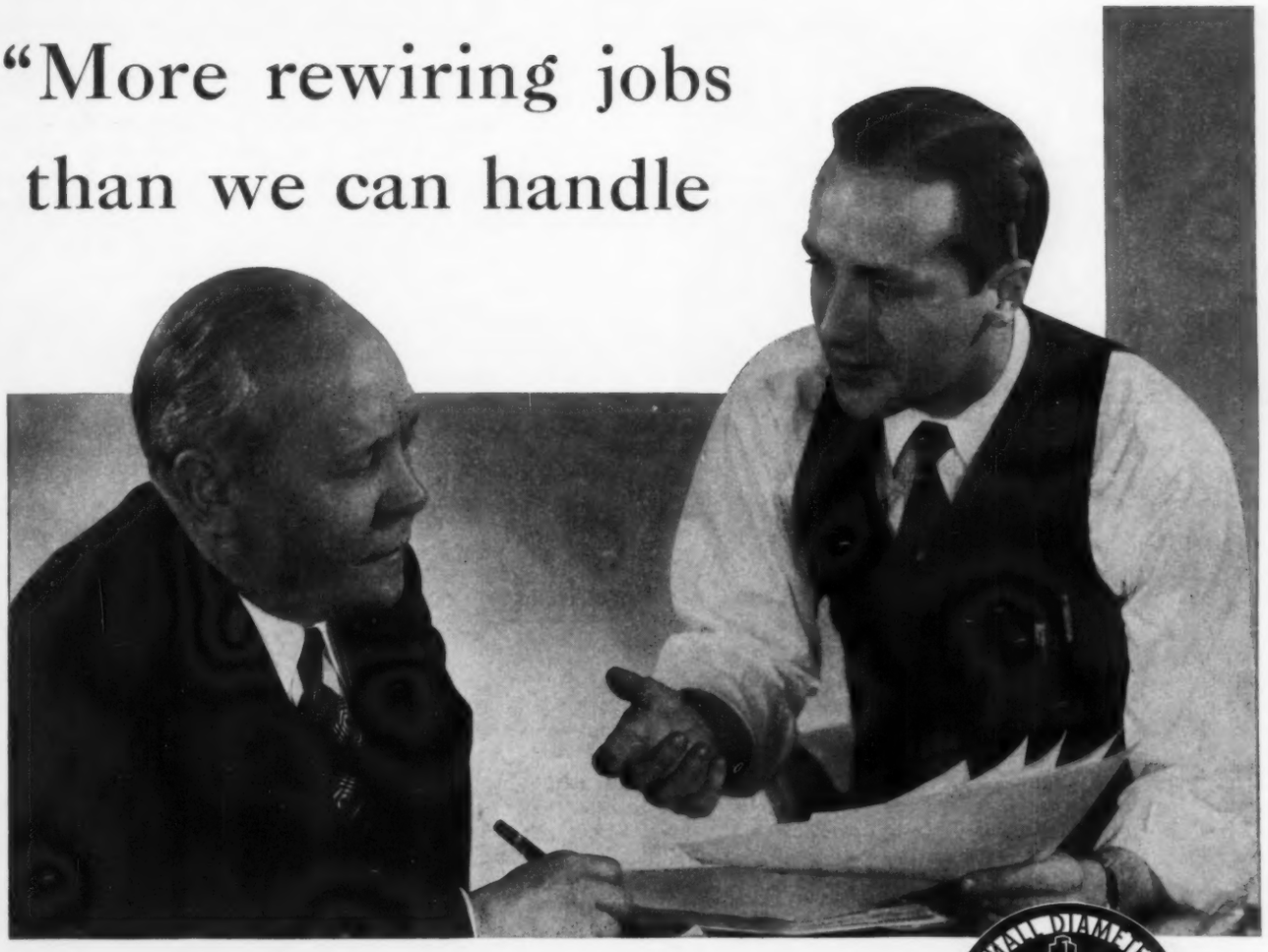
WANTED
Turbo Generator
WITH CONDENSER AND AUXILIARIES
5,000 to 10,000 KVA
6600 Volts—3-phase—50 cycles
Give Price, Age, and Location
REPLY BOX 301
Electrical West
68 Post Street San Francisco

G.C.A.
Lamp Replacers
Lamp Base Removers
Cartridge Fuse Tongs
Switch Hooks
Send for Catalogue
We have been making safety tools for 24 years
THE G. C. A. Manufacturing Co.
Pittsfield, Mass.

TORK CLOCKS

THE POPULAR TIME SWITCH LINE KNOWN EVERYWHERE
NOW—lower prices and higher capacities
There is a Tork Clock for every regular switching job; 60 minute, 4 hour or daily cycles.
Bulletins on request
THE TORK CLOCK CO., Inc.
MOUNT VERNON, N. Y.
Representatives:
A. R. Slimmon, 445 E. 3rd St., Los Angeles
Geo. H. Curtiss, 540 McAllister St., S. F.
H. M. Sayers, 1019 Eastlake Ave., Seattle
Stevens Sales Co., 41 P. O. Place, Salt Lake City

"More rewiring jobs than we can handle



thanks to these new AMPEROX *Small-Diameter Building Wires"*

"BUILDING operators in this district were up against it. They were losing tenants because they couldn't supply enough electrical capacity. And their old conduits were loaded to the hilt. We could understand why they didn't want to go to the expense and nuisance of ripping out the old conduits and installing new and larger ones.

"But that's all changed now. These new Amperox Small-Diameter Building Wires make it possible to double or even triple present current-carrying capacity without over-filling the old conduit. In one rewiring job, we cut the estimated cost from $70,000 to $10,000; and in a smaller job, from $408 to $185.

"Now we're getting more rewiring jobs than we can handle. With costs down to a fraction of what they were before, building operators are installing adequate wiring without waste of time."

COMPLETE LINE—American Steel & Wire Company produces a complete line of small-diameter building wires, including Amperox heat-resistant grade (Type RHT), Amerite performance grade (Type RPT), and Ampyrol synthetic insulated (Type SN). All are produced with the same quality and precision which characterize electrical wires and cables by American Steel & Wire. Write for data.

SMALL DIAMETER AMPEROX BUILDING WIRES

Comparative Diameters

Standard Type R Code Wire

	8	10	12	14
Rubber	4/64"	3/64"	3/64"	3/64"
O.D.	.290"	.230"	.210"	.190"

Amperox Small-Diameter Wire Type RHT

	8	10	12	14
Rubber	3/64"	2/64"	2/64"	2/64"
O.D.	.250"	.200"	.180"	.160"

Approved by Underwriters' Laboratories

COLUMBIA STEEL COMPANY, *San Francisco, Pacific Coast Distributors of Electrical Cords & Cables*
Manufactured by
AMERICAN STEEL & WIRE COMPANY, *Cleveland, Chicago and New York*
United States Steel Export Company, New York

UNITED STATES STEEL

ELECTRA'S HUSBAND

Adequacy, Oh Yeah?

WE did not expect our guest to explode the way he did when I asked the simple question, "What do you think of this Adequate Wiring program"?

But I must have touched a tender spot, a sore bruise, a raw nerve, for he sputtered a few minutes and then lit into it.

"The best way to tell the worth of an article, an institution, an idea, or what have you, is to try to sell it to yourself," he snarled sarcastically, "so I had always believed. At least that taught me plenty about our present plans to sell adequate wiring in the most inadequate way."

"Them's strong words, stranger," I had to warn him. "After all you can't talk like that in my house and not smile." He caught himself and laughed and then of course it was all right for him to go on and cuss the industry.

"Just a while ago," he reminded me, "I built a six-room house. Because I was an electrical man, part of a great, growing industry, I wanted it adequately wired. When I placed the plans in the hands of the architect, I told him sternly that I wanted plenty of outlets and plenty of service capacity.

"Imagine my surprise on reviewing the plans to find about half the outlets I had anticipated, and only half the service capacity. And lo and behold, six circuits where I expected to use approximately 30!"

I let him go on. After all when a man really wants 30 circuits in a six-room house who am I to interrupt him?

"Meeting with my friend the architect I pointed out the glaring omissions on his part respecting my initial wishes. At last he did concede that he could 'work in' 180 outlets for my modest six-room, brick veneered home but that was his limit. Anything after that would just appear ridiculous.

"Now I am counting convenience outlets, ceiling outlets and switches as outlets, you understand. But today that architect is convinced on the idea of adequate wiring because I showed him case after case he had overlooked in which an outlet was really needed. Our total number of outlets is 205. We could have used even more."

Warming up to his real gripe, he drew a deep one from his pipe and blew both smoke and words out in the next volley.

"Let me tell you something about the electrical contractors next. After the plans were all accepted, we searched for an electrical contractor. This was more pathetic than ever. I received bids ranging from $300 under my own crude estimate to $300 above it. One contractor, after reviewing the plans, actually cut out 20% of the outlets because he thought there were too many. At last one had the brass to offer to take the job on a time and material basis. I was so disgusted I threw out all the bids and decided to do the work myself."

My friend started with the tools and he can still jerk wire if he has to. In this case he evidently felt justified for he went on to say—

"Here was where the real fun began! I had decided to use non-metallic sheathed cable and the best grades of wiring devices. You would be surprised to learn how many people without very much experience condemn non-metallic sheathed cable as junk. They say the rats will eat it, that it will mildew, that it is flammable, that it is all sorts of things it isn't.

"Nevertheless, some 5,400 ft. of No. 12 was used to wire this house and I'm not sorry one bit. I even had to prove it to people in the industry. I tried to damage and burn the stuff to show that it would take abuse far greater than any I'd ever give it. As for receptacles, switches and the like, just try to buy first class goods and see how you are kidded.

"I had decided to use three No. 1's for the service. These were pulled in from a meter can upon which there was provision for a meter-back. Believe it or not, when I started to connect the wires to that meter-back I was absolutely dumbfounded to learn that the largest meter-back the power company stocked had terminals for No. 4 wire. When I inquired what to do in this instance, to get No. 1 wire in a No. 4 terminal, I was informed by the power company to cut out the extra strands. Can you beat it?

"Apparently the only contact made in this entire farce who I found to be interested in adequacy was the manufacturer of panel-boards and kindred material. This one insisted that I use an over-capacity main switch and enough branch circuit spares to take care of any surplus needs that I might have. This was my big surprise.

"Oh, I nearly forget the fixtures. Oh boy! Did you ever see something so flimsy that you felt you would crunch it if you took it in your hands?

"We did succeed in procuring a substantial lot of fixtures, but believe me, it was a searching job. Here is a branch of the electrical industry that is absolutely not in step with the adequacy idea. Its whole plan seemingly is to do something that will catch the eye, forgetful of the fact that the fixture itself can be a heat agent that may prove a source of danger to any home in which it is installed."

"Not to mention that it is an agent of the devil to eyes which try to read by its light," I added for good measure.

"My conclusions after this experience would be the conclusions of any electrical man," our guest finished. "I was disgusted. I still am. I am even cynical with anyone who waxes enthusiastic about electrical adequacy. I just wonder if he is sincere. I am convinced that the electrical industry just does not know what the term 'electrical adequacy' means. Everyone talks about it a lot. Sometimes some individual does grasp, just grasp the meaning of it all in a literal sense. But by and large, 90% of the electrical men are afraid to speak up when the owner is undecided as to the course to take between the financial demands of the plumber, carpenter, bricklayer, and what not. They all present their case for a little extra dip into the owners' pocketbook, except the electrical man.

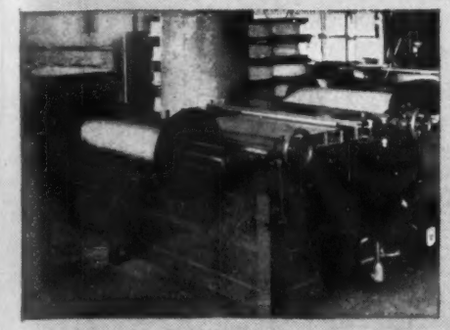
"You know, the manufacturer of electrical appliances has done a fairly good selling job of selling his wares. The refrigerator salesman, the range salesman, the radio salesman and the dozens of other household utility people have done an extra fine job of acquainting the public with the convenience, if not the necessity, of purchasing this or that current consuming device.

"But after it is bought — oh boy! Then comes the time to find a place to plug it in, and the man who was yelling adequacy previously at the top of his voice at the moment can't be found."

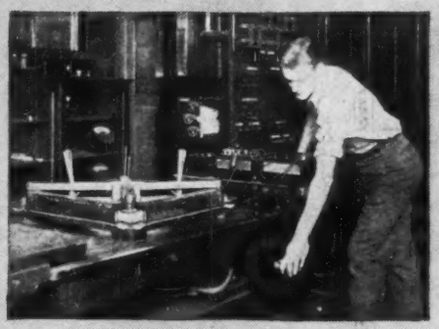
From Electra in the other room came this last word, "I'd like to find the man who wired *this* house. I'd just like to sew him up in the wire he *didn't* put into it. He'd never get himself untangled."

WAGNER POWER TRANSFORMERS

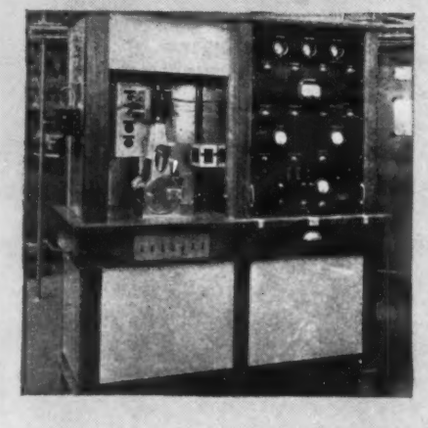
ACCURATE TESTING
ASSURES USER SATISFACTION



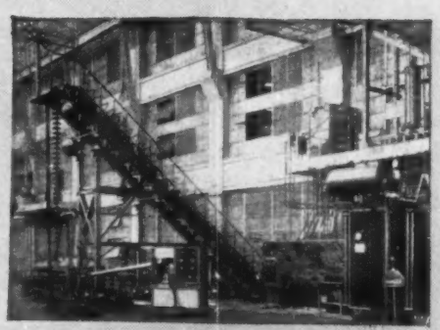
Insulation-testing machine used to determine if insulation has proper characteristics and will meet high Wagner specifications.



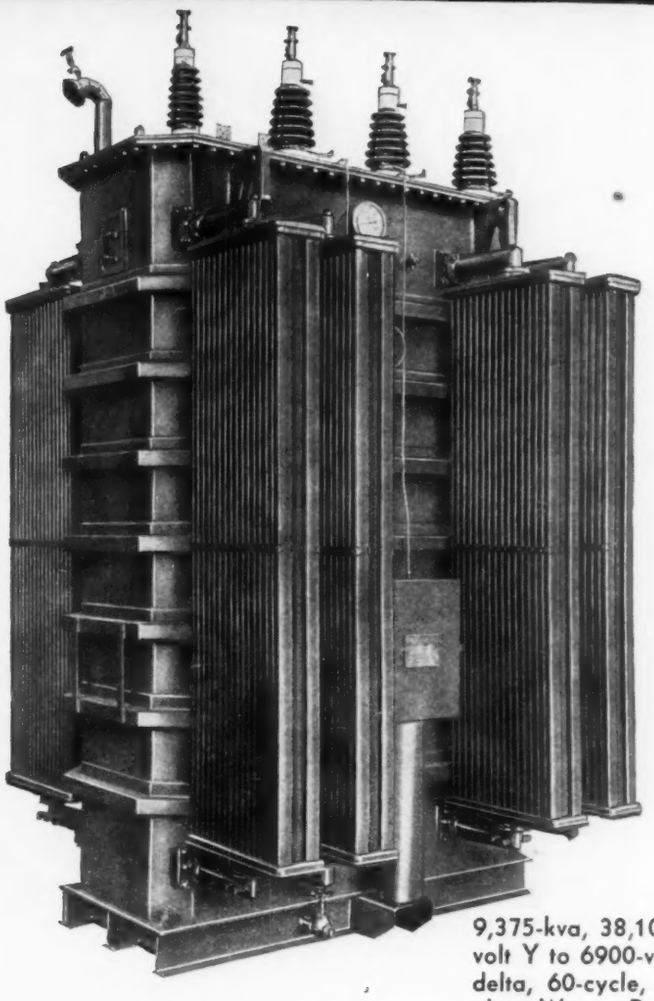
"Epstein test" of Silicon Steel. No shipment from manufacturer is accepted by Wagner until sample sheets have passed rigid Wagner tests for specified electrical and physical properties.



Cathode-ray oscillograph. A most valuable instrument in determining the wave-shape and form of the current when impulse-testing transformers.



Surge Generator. Used primarily for impulse-testing transformers and special testing of various types of installations.



9,375-kva, 38,100-volt Y to 6900-volt delta, 60-cycle, 3-phase Wagner Power transformer with inert gas equipment.

TAILORED TO MEASURE

Wagner Electric Corporation, with its large plant and vast manufacturing facilities, is particularly well equipped to build power transformers "tailored to measure"— regardless of the size or type.

Every Wagner transformer incorporates features and improvements that have been developed through almost fifty years of transformer manufacturing experience.

Broad experience . . . modern manufacturing facilities . . . proved performance—these assure you that Wagner power transformers will give efficient, dependable service with minimum up-keep.

Wagner experience is not limited to one type of transformer. Wagner manufactures in addition to power transformers, a complete line of distribution transformers (single or three-phase, rural-line, and air-cooled) and type Y-H constant-current regulator.

Specify Wagner transformers on your next request for quotation —meanwhile write for descriptive literature on Wagner transformers.

T40-9

Send for COMPLETE LITERATURE

Wagner Electric Corporation

6400 Plymouth Avenue, Saint Louis, Mo., U.S.A.

TRANSFORMERS • MOTORS • FANS • BRAKES

Turn THE LIGHT ON THIS NEW THREE BEATER MIXER

$19.95

$22.75
COMPLETE WITH
JUICE EXTRACTOR

FEATURES OF THE TRIPLE-WHIP MIXER

The only three-beater mixer — newly designed beaters—easy-to-attach—easy-to-remove
Powerful motor—with sufficient power to do all necessary household mixing, beating and whipping operations
Convenient switch control—controls all speeds and provides single-hand control
White baked enamel finish
Opal white large and small mixing bowls
Single-position bowl support
Easy-to-grip carrying handle for portable operation
Mixing light — provides clear visibility of all mixing operations at all times
Swivel control—located for finger-tip operation — makes possible the convenient use of all accessories
Permanently connected—all-rubber approved cord
Juice extractor — easily attached — consists of juice bowl, reamer and adjustable spout
A complete range of additional accessories, for food chopping, slicing and shredding, grating, knife sharpening, buffing, etc., are available at additional cost.

ADVERTISING AND PROMOTIONAL PROGRAM

NATIONAL ADVERTISING

The General Electric Triple-Whip Mixer will be extensively advertised in *Life, Good Housekeeping* and *Ladies' Home Journal* during this Fall.

SPECIAL PROMOTIONAL AIDS

Folders, banners, displays and ad-mats are all part of a complete promotional offer. See your G-E Distributor at once for complete details.

GENERAL ELECTRIC

APPLIANCE AND MERCHANDISE DEPARTMENT, BRIDGEPORT, CONNECTICUT • ONTARIO, CALIFORNIA

What About These New Wires?

An explanation of their development, characteristics, uses, limitations, as told to the two inspector conventions

By Howard H. Weber

TWENTY years ago, even ten years years ago, scarcely any one of us could foresee that by the year 1940 thousands of office buildings, apartment houses, hotels, and stores would be obsolete electrically. The fact is today that rewiring of commercial and industrial buildings from an operating standpoint has become a "national emergency." Existing circuits in conduits cannot possibly carry the tremendous load required by new electrical appliances, improved lighting, and air-conditioning apparatus. Even for the new wiring of buildings our conception of the conductors is changing.

Recognizing this situation, provisions have been made in the 1940 National Electrical Code for the special use of new wires and cables. Drastic and comprehensive as these changes are, at first sight they seem confusing and difficult to understand. These remarks are designed to simplify and to help understand more easily what the tremendous changes involve.

Consider this subject from four points of view. First—Here is the Code and here is what it provides.

Type R wire as we have known it has existed in the National Electrical Code as the standard building wire for more than 50 years. As for its current-carrying capacity, little was thought of it. True enough the Code did state that it should not be used where the ambient temperature exceeded 49° C. In the days when type R wire was designed, conductors were seldom if ever continuously loaded and the heating effect due to loading was not a serious factor. Nowadays conditions are different. The Code still does call for 15 amp. branch circuits. Yet all of us have seen installations where fuses have been tied, pennies used, and frequently conductors actually warm to the touch!

About three years ago the National Electrical Manufacturers Assn. undertook a fact finding investigation in order to determine the effect of continuous heating of rubber-insulated wires and cables. The results are carefully tabulated in the famous NEMA report on current-carrying capacity. This report served as a basis for changing our thinking and was largely responsible for the change in the N.E.C. typified by Figure 1. Instead of only Type R building wire, we now have eight rubber insulated wires, and the table in the Code provides for nineteen different conductors, if other insulations are included. The important thing about the tabulation is that the temperature limitation now becomes a determining factor in applying the rules.

For example, type R wire is limited to safe operation where the temperature does not exceed 50° C. This wire, ordinary Code wire, has been judged according to a minimum standard, and any wire in the past, regardless of additional quality, was labeled type R, by Underwriters Laboratories. This wire is still retained in the Code. However, as time elapsed, progress occurred in manufacturing and processing. American Society for Testing Materials was among the first to recognize that while wire could be built to a specification, wire so built was not always the best wire made and its characteristics were not always discernible by a chemical analysis. So a new method of judging wire was evolved. Judgment was based on actual accelerated performance, and so this new type of wire became known as "Performance" wire. In the new Code it is designated as RP. The operating temperature is 60° C.

Still another development—this discovery of the use of high-powered accelerators and anti-oxidants—and the design and use of the so-called continuous cure machines brought forth a heat-resistant type of compound, designated in the new Code as RH. This will safely operate at 75° C.

Figure 1.

Rubber Insulated Building Wires—N. E. C. Standard

Operating Temp.	50° C.	60° C.	75° C.
N. E. C. Type Letter	Standard Ins. R No. 14—3/64" R.W.) RW	RP No. 14—3/64" R.W.) RPT (No. 14—1/32" R.W.) No. 10 No. 12 No. 14 RU (.018"—No. 14-12-10) SN (1/32"—No. 14-410)	RH No. 14—3/64" R.W.) RHT (1/32" R.W.— No. 14) No. 14, 12, 10 & 8 3/64"

The 1937 edition of the N. E. C., in Section 3035 provided for the use, under certain conditions, of non-leaded conductors in lieu of lead-covered wire. The 1940 N. E. Code for the first time designates a type letter for this wire—RW—rubber water resistant, good for operation at 50° C.

Fundamentally these are the four rubber-insulated building wires. They can be used anywhere. Their wall insulation is standard and the wires in appearance are like the old Code-type wire with which all of us are familiar.

For rewiring of existing buildings it is that provisions in the new Code permit the use of smaller diameter wires. —conductors which have a reduced insulation thickness. These are designated in the Code as RPT, RHT, RU, and SN. We will discuss them in detail later.

What the National Electrical Code Permits

The new temperature limitations on the various grades of rubber have already been explained. This means that theoretically the amperage may be increased. The table indicates the current ratings of the various insulations as permitted in the 1940 Code. For example, take a No. 14 wire which in the old Code was designated Type R. It was and is rated at 15 amp. Insulations graded for 60° C. operation are rated at 18 amp. and insulations graded for 75° C. operation at 22 amp.

In other words, the Code provides that with these new insulations you can operate the conductors better and thereby increase the load on these conductors.

Table 1 is applicable to installations where the conductors do not exceed three in a raceway or conduit. Where other than room temperature is encountered, a correction factor for room temperatures over 30° C. applies.

In the Code this appears as shown in Figure 2.

If the raceway contains from 4 to 6 conductors the current values are reduced from those previously shown to 80%. If from 7 to 9 conductors are involved, the tables are reduced to 70%.

What this means is this: Take 3 type-R No. 8 AWG wires in conduit.

At room temperature 86° F. (30° C.) the current value is 35. If the temperature of the room is increased to 104° F. (40° C) the capacity drops to 25 amp. When the room temperature gets to 50° C. (122° F.) the rated operating temperature of the wire, the current falls to 0 and type R wire is useless.

Now let us consider type-RH wire—the heat-resistant rubber insulation:

At room temperature 80° F. (30° C.) the current value is 49 amp.

Figure 2.

AWG Size	1937 N.E.C. Type R Wire, No Limitation on No. Cond. in Raceway		1940 National Electrical Code 3 wires per Conduit 50° C. Type R & RW	60° C. Type RP, RPT,	75° C. Type RH & RHT RU, & SN
No. 14	15		15	18	22
No. 12	20		20	23	27
No. 10	25		25	31	37
No. 8	35	(Here is where Changes start in Type R)	35	41	49
No. 6	50		45	54	65
	—		—	—	—
No. 4	70		60	72	86
No. 2	90		80	96	115
No. 1	100		91	110	131
No. 0	125		105	127	151
No. 00	150		120	145	173
No. 000	175		138	166	199
No. 0000	225		160	193	230

At a room temperature increased to 104°F. (40° C.) the value is 44 amp; at 122° F. (50° C.) the loading is 37 amp, and at 140°F. (60°C.) is 28 amp.

Typical of what the new Code permits then is a comparison of current ratings between the 1937 Code and the 1940 Code.

Another very important change involves the rule for permissible conduit fill for new work as well as for rewiring.

Table XI of the 1940 Code provides for groups or combinations of conductors not included in the Tables 4 to 10, it is recommended that the conduit or tubing be of such size that the sum of the cross-sectional areas of the individual conductors will not be more than the percentage of the interior cross-sectional area of the conduit or tubing than as shown in Figure 3.

One very important thing to be remembered is that the larger the percentage conduit fill is permissible only with the rewiring materials; *i.e.*, thin wall insulations (RHT, HPT, RU, and SN). It does not apply to the regular insulated wires such as Type R, even though Type R wire might conceivably be used on a rewiring job.

Inspectors and contractors can easily figure for themselves the various combinations allowable because the 1940 Code, in tables 14, 15, and 19 gives the overall diameter and cross-sectional area of various wires and raceways. Before proceeding to the next division in this discussion, there are two considerations that are important.

I have told about the increased current ratings of these wires and the higher temperatures at which some of these wires will function with little or no deterioration. We cannot lose sight of the fact that the N. E. Code still requires 15 amp. fuses, and branches as such cannot be loaded beyond 15 amps. except under certain special conditions. Furthermore the Code tables as I have discussed them do not take into consideration voltage drop. With the higher allowable currents in some cases voltage drop becomes of great importance and should have special attention.

Wires Provides for Installation Under Rules Discussed

Type R wire is the conductor designed for operation at temperatures up to 50° C. This wire is known to all as Code Wire.

RW wire is designed to operate at 50° C. also, yet it can be used in wet locations without a lead sheath when subject to water.

Figure 3.

Per Cent Area of Conduit or Tubing

	Number of Conductors 1	2	3	4	Over 4
*Conductors (not lead covered)	53	31	43	40	40
Lead-covered conductors	55	30	40	38	35
For rewiring existing raceways with thinner insulated conductors as provided in 3005-d and e	60	40	50	50	50

* For Type RHT conductors used for other than rewiring in existing raceways, the areas shown in Table 13 shall be used in place of the areas shown in Table 14.

For carrying capacity of more than three conductors in a conduit or tubing, see Tables 1 and 2, Note 5.

See Tables 13 to 19 for dimensions of conductors, conduit and tubing.

Type RP is rated for use at 60° C. *Type RH* differs from *Type R* only in that it is rated at 75° C. These are offered by manufacturers for operation where temperatures up to 75° C. may be obtained, and are offered under manufacturers trade names such as "Eonite" or "Performite" and the like.

RHT is the thin wall, all-purpose wire. The conductor insulation is the same as that on RH wire. However the insulation thickness is thinner in the RHT; it is 2/64" for No. 14 to No. 10, and 3/64" for No. 8. This wire is only available in these sizes. In considering the application for RHT wires—it should be recalled that they can be used wherever types R, RP and RH are acceptable. Therefore it is likely that RHT wire to some extent will replace Code wire.

RPT wire is similar in appearance to RHT. However the RPT is limited in application to rewiring *only!* It is obtainable in sizes 14, 12 and 10 only.

Two Smallest Wires

This brings us to the two smallest diameter building wires recognized in the new Code. The first of these is the synthetic type known as SN. It has an insulation different from rubber. There is no rubber in it. The wire has no fibrous covering over the insulation. The insulation is a so-called plastic. Chemically the material is known as plasticized polyvinyl chloride, vinyl acetate or a combination of materials of this class. It has many of the characteristics of rubber. Its dielectric strength is high; mechanically, it is strong; it resists oil, mild acids, alkalis and moisture. The insulation is tough and it is flame retardant. It has a tendency in its present form to be thermoplastic and the present Code states that synthetic insulations may stiffen at temperatures below freezing and care should be used in its installation at these temperatures.

RU wire is the second of the smallest rewiring materials and the smallest rubber covered wire available. This is a rubber insulated building wire with a fibrous covering, moisture resistant and flame retardant in finish. This wire in appearance and handling is like the conventional rubber insulated building wire used for more than 50 years. The rubber insulation is not processed like ordinary wire. Because of this process discovery and improvements in manufacturing, it is possible to obtain the exceptionally high electrical and physical properties and still retain the thin wall. The insulation consists of 90% unmilled, grainless rubber applied in liquid form —the latex of the rubber tree. This liquid is put through processing for refinement and improving of characteristics as an electrical insulation. The bare tinned copper wire is run through a bath of latex, passing into a drying tower and another dip or coat applied, and the process repeated until a wall of the desired thickness is obtained. In this manner,—similar to the application of lacquer to enameled wire,—a solid homegeneous insulation, always with the conductor well centered, is provided. This wire is available *for rewiring only* in sizes No. 14, 12 and 10. The insulation thickness is .018 inches (less than 1/32").

Over the insulation is applied a fibrous wrap covering—the new finish giving maximum coverage, through saturation and a clean smooth finish assuring easy fishing.

Because the two types SN and RU are so much smaller than the RPT and RHT, the former will probably be widely used for rewiring. As an example:

A typical floor in a large centrally located office building was chosen. A floor plan showing present circuits and conduits was submitted to a reputable electrical contractor for estimating the job in two ways, the one with 1937 code wire and the other on the basis of rewiring with the new type small diameter:

Present conduits in this building were of 660 watts capacity (or 1 watt per sq. ft.), with three offices having one outlet each per circuit. Runs from the panel board to the first office on each circuit consisted of two No. 12 wires, with a total of four No. 12 wires in each of six ¾" conduit runs. Connecting the three ceiling outlets on each circuit are two No. 14 wires in ½" conduits.

Both methods of rewiring were figured on the basis of one 1500-watt circuit per office or 7½ watts per sq. ft., using 4-wire, 3-phase circuits. Comparative costs were based only on the conduit and wire and the replastering work necessary, since the cost of removing and replacing fixtures and connecting circuits to the panelboard would be the same in either case. Furthermore, to obtain a true comparison of actual wiring costs, the question of additional outlets, panelboards, new fixtures, other extras, was left out of this basic job.

Cost of the job done with small diameter wire was found to be $184.36:

4300 feet No. 12 small diameter wire at $21.75 per M feet	$ 93.52
Labor	90.84
	$184.36

Cost of installing the necessary conduit and doing the job in the old way came to $407.69 made up as follows:

4300 feet of No. 12 code wire at $12.65 per M feet	$ 54.39
325 feet 1-in. and 70 feet ¾-in. flexible conduit with fittings	76.78
Electrical labor	126.52
Labor and material, replastering and refinishing ceiling	150.00
	$407.69

Thus a saving of $223.33 or 55%, is shown in favor of the small diameter job; this despite the fact that the cost of small diameter wire at present is 72% greater than that of code wire. It might further be noted, that the ceilings on this particular building are furred, and the installation of the new conduit presented no unusual problems.

Considering the problem as typified and described, it would seem that these new wires can open a huge market, affording an enexpensive method of modernizing.

Prohibitive Costs Before

Until now electrical modernization could have been effected only at prohibitive costs, because floors, walls and ceilings would have to be torn up in order to allow installation of more conduit to carry the added circuits.

Today, under the 1940 edition, N.E. Code, with small diameter wires available, and with 50% conduit fill instead of 40% existing raceways can carry the needed larger capacities and added circuits.

Thus electrical modernization can be accomplished at a fraction of the cost formerly involved. Truly the bottleneck is broken! Thousands of jobs should be available and now we can utilize old buildings for industry that otherwise would be vacant. In this industrial emergency this is important! For the first time the inspector who makes a re-inspection, finding inadequate or faulty wire, is in a position to offer a suggestion to the harassed building owner which will be received with sympathy and enthusiasm.

Survey

A leading trade journal (Electrical Contracting) made the survey. It is based on buildings 10 or more years old.

It shows that of the office buildings surveyed in the United States, 88% are obsolete (17,831); 95% of hotels having more than 50 rooms (7,052); 98% of hotels under 50 rooms (22,140); 75% of department stores (2,727); schools we are proud of—in America—and yet—95% grade schools are obsolete electrically (236,198); 87% of high schools (23,738); 85% of colleges (1,594) and 98% of private schools (2,741).

In addition there are many industrial properties having raceways, many private homes wired in conduit which are potential users of these wires. The modernization of these buildings comprises the problem before us today. The 1940 N.E. Code presents the rules to help solve the problem. The products are available and approved. Where and how they will be used is up to the industry now.

Blitz Hits the Bureau

Los Angeles selling forces find themselves abandoned by evacuation of an ally; super-service domestic sales program emaciated, advertising reduced, League killed

WHAT is happening in Los Angeles anyway? The question puzzles and confuses the electrical industry because of a revolutionary turn of events. Simplified to the extreme the answer seems to be that the Bureau of Power and Light, in a wave of political reform, is swinging to the other extreme of the sales pendulum—from the sales minded "Won't you try some more electricity, it's good for you," to the hard boiled, cold turkey, "If you want electricity, come and get it."

ELECTRICAL WEST presents the following facts without conclusions:

Political

Mayor Shaw, in a recall election, was replaced by Judge Fletcher Bowron. Mayor Bowron, in radio talks to the public, declared that he intends to break up local political machines. He asked for the resignation of the entire Board of Water & Power Commissioners.

Three of the five resigned; president of the board Watt L. Moreland and vice-president F. D. Howell refused. The mayor appointed J. B. Agnew, W. B. Himrod and W. R. Fawcett, who have since voted as a bloc. Moreland and Howell, outvoted solidly since the new board was appointed, finally resigned, effective Aug. 31, declaring the board had exceeded its functions and actually taken over the management's responsibilities.

Meanwhile the short term appointment of Fawcett expired July 1, and Bowron reappointed him. The city council a majority of which is taking issue with the mayor on his power policy, twice rejected the appointment, but Mayor Bowron declared he would keep appointing him and no one else. The two new vacancies have not yet been filled.

On Jan. 23. 1940, Ford, Bacon & Davis Inc., consulting engineers, were given a contract to survey the entire operations of the water and power departments. Report No. 2, covering the operations of the business agent's division, or sales end of the business, was presented to the board on June 25. Moreland and Howell made a futile protest on the grounds that it ran counter to the philosophy of public ownership.

It was accepted over these protests as well as over a dissenting report by Lester S. Ready, consulting engineer, called in by E. F. Scattergood, chief engineer and general manager, to study the previous report. Deaf ears were turned also to an official and carefully documented request for reconsideration presented by Harold L. Conklin, president of the Electrical Development League of Southern California.

E. F. Scattergood on Aug. 1, was retired from his managerial position to that of consulting engineer on a three-year contract at $24,000 a year. His contract is renewable, but after 3 years is subject to cancellation on 90-days notice. By terms of the contract Scattergood may only devote himself to such matters as are specifically directed to him in writing by the board and any effort on his part to influence politics, directly or indirectly, are declared cause for termination of his contract.

Invoking the policy for retirement at age 65, Burdette Moody, business agent since the inception of the Bureau, was removed. Chester H. Dye, in charge of domestic sales was returned to his original status as power salesman. Other members of his staff have been reduced in rank also. In the reorganization to fit the Ford, Bacon & Davis recommendations between 170 and 200 people in the business agents division have been dropped and others transferred to other divisions as of Aug. 1.

Innocent Victim

Innocent victim of the purge was the industry's sales promotional organization, the Electrical Development League of Southern California, which at the June 25 meeting of the board had asked for a reconsideration of the reduced budget since the latter would seriously retard domestic appliance load building.

On Sept. 5, the board moved to cut off not only its financial support to the League, but to support it no longer in manpower (which was one way the Bureau had helped even up its contribution with that of the Southern California Edison Co. previously) or in membership. Cynically Commissioner Fawcett declared that other financial support of the League would drop out too.

Remaining hope of keeping the League alive vanished when Edison and the larger manufacturer supporters withdrew in order not to become entangled in local politics over it. The directors met for the last time Sept. 19, and voted to close the League Oct. 1.

Philosophy

Expressed in the letter of transmittal to the board accompanying the report is the philosophy now being followed. Two schools of thought, it says, exist regarding the purpose and activities of the division.

1. Being publically owned, the bureau should extend itself further in the interest of electric consumers, many of whom are also taxpayers, than a private utility, but as a result the user pays for a certain amount of civic activity.

2. The Bureau is in business to generate, transmit and distribute electricity at lowest rates consistent with good business operation.

Ford, Bacon & Davis then state:

"At the outset of our survey of the operations of the business agent's division, it was obvious to us that the division was doing a number of things that we thought should not be done at all, by it or by any other division of the Bureau of Power and Light, and we proceeded on the assumption that those activities would be eliminated. Under such circumstances, we did not study the operations of the division on its then basis of activity.

"The reduction in the proposed expenditures of this division, as recommended by us, is possible primarily on account of this difference in viewpoint, and it does not necessarily mean that the division is uneconomically operated if one takes the view adopted by the department officials, i.e., that it is interested in public welfare as well as in the business of electric operation.

"We did not believe the board would be interested in a study of the effectiveness of the operations of the sections that we propose to eliminate in their entirety."

Costs and Budget

Costs of sales promotion are compared in a number of tables in the report. Among them the following is made: Comparing costs and growth from 1932 to 1940, using 1932 as 100%, sales of kilowatt-hours increased 245, operating revenue 202, number of customers 220 (including the additions of 183,347 customers taken over from Los Angeles Gas & Electric Co. and 44,893 from Edison) while the business agent's expense increased 637%.

Original budget of the business agents division, as of March, 1940, was for $1,783,600, divided into $660,490 for consumer relations repairs and service

and $1,123,110 for load building. This was later revised to reduce it to $1,640,-600.

The Ford, Bacon & Davis recommended budget, which was adopted, was for $734,571, plus a transfer of $237,-143 to the operating divisions. Thus by cutting an estimated $668,886 from the combined budget, the total for the new year would be $971,714. The business agent's division allotment of $734,600 was to be allowed an additional $162,-000 to take care of the readjustment period. These figures do not include rent or general overhead.

Advertising, included in the above, was reduced from the asked for $187,-500 to not more than $75,000 with the recommendation that material reduction be made especially in major appliance ads (which last year took 70.5% of the budget) and to consist of direct mail and a small amount of newspaper ad space.

"The reason for this is that the territory served by the Bureau is not of a competitive nature insofar as electrical energy is concerned and the Bureau does not merchandise appliances direct, other than to employees," the Ford, Bacon & Davis report says.

(Dan B. Minor advertising agency contract was cancelled.)

(In its presentation the League had summed up total advertising of the bureau as only half that spent by the gas company.)

(In a Los Angeles Times interview, July 7, Mayor Bowron accused councilmen opposing him of having been recipients of help from the business agent's division by the placing of ads in small community newspapers.)

Eliminated

In conforming to the Ford Bacon & Davis recommendations the Business agent's division will do these things:

Reduce the *commercial subdivision* by eliminating 13 new residential wiring salesmen (transferring this function to domestic sales), abolish the sales prospect group, cut the illuminating engineering staff from 11 to 3, eliminate the cooking and heating, the private power and air conditioning, the residential electric heating representatives, retain one industrial specialist and one wiring coordinator and some general power salesmen.

In the *general administration subdivision*, transfer the direct mail and advertising department to the bureau's main publicity department, transfer sales statistics to the general office statistical department, eliminate the range and water heater standards (a unique service—see Electrical West, Oct. 1939, p. 29) transfer rate applications and power surveys and new service sales to the operating commercial division, the street lighting sales to power sales and eliminate the frequency change file, transfer future frequency changing to the design and construction, testing to its test laboratory.

In *kitchen planning and displays and employee sales*—transfer kitchen plans to the domestic sales, only making plans for houses of $7,500 or over; eliminate employee sales (the board at its Sept. 5 meeting voted to abolish employee purchases of appliances at a discount or on terms).

The domestic sales, installation, maintenance, demonstration of domestic appliances subdivision, containing some of the bureau's most outstanding services to public and dealers was told to do as follows:

Discontinue assistance to small dealers concencrate on a selective group of important dealers (because between 54 and 63 per cent of total dealers sold only 1 or 2 ranges a year.)

Make sales supervisors also be dealer contact men and wiring men.

Eliminate home service following up range sales except where specifically requested. Eliminate hostesses at branch offices. Domestic science staff of 2 or 3 was retained to give group demonstrations (Mary W. Schweitzer, heading home service, has been dropped).

Special plumbing contact man (responsible for getting the plumbing industry interested in electric water heaters for the first time) eliminated.

Dealer-salesmen cooperative plan completely eliminated. (Since Sept. 15, 1939 the bureau has hired and trained salesmen, shared in their base pay with 75 cooperating dealers in exchange for 100 home appliance surveys per month by paying $25 per month for these. Ford, Bacon & Davis maintained that it was not the bureau's responsibility to help pay dealer salesmen.)

Erase the routine testing of ranges and water heaters and their delivery and installation (The bureau pioneered this most unusual service, receiving new ranges from wholesalers at dealers' orders, giving them thorough check-up and test, delivering them with swank to the proud new owner). The report declared that this was the manufacturers' and dealers' responsibility.

Maintenance and repair was shunted to the trouble department of the operating division. Office records of such repair work were to be eliminated.

Wiring inspection work was to be retained but free wiring of ranges curtailed. First recommendation was to cut the free range wiring allowance to $15, water heater to $10, as against the former $40 and $15. (The bureau, in a contract with one contractor was getting a standard price of $34 for range installation.) At a later board meeting the allowance was raised to $20 for the first unit, $10 the second, no matter which was installed first. (Ford, Bacon & Davis report showed there had been 1.28 wirings per range, 1.05 per water heater, because of the policy of not limiting number of times a range would be wired in. Some had been wired as often as 6 times. Approximate cost per range was $50 for the 22.000 total ranges.)

E. H. & F. A. financing of dealer paper and collecting by the bureau with light bills was recommended abolished or a new contract reducing the expense of handling the contracts negotiated.

Personnel

The Ford, Bacon & Davis recommendations now being followed advised simplification of the business agent's division to two sections, one on commercial and industrial sales, the other domestic sales. The former contains power salesmen, 3 illuminating engineers, one industrial engineer and a wiring coordinator. The domestic section contains sales promotion, domestic science, market analysis, direct mail and advertising, accounting and clerical, EH&FA financing (if retained) and displays and kitchen planning.

With the retirement of Burdette Moody, E. V. Kane, one of his former three assistants, has been appointed acting business agent until civil service examinations and appointments are made by the board. E. C. Snyder, another assistant, is retained as assistant business agent. A. W. Elliott, the third former assistant is now in charge of displays and kitchen planning.

Clarence H. Brunner, with the bureau 12 years, the last six on domestic sales, has been appointed head of the domestic sales section. Mrs. L. Owens heads the domestic science staff. T. H. Shepherd, R. A. Crosby and Lloyd Gates are the three lighting engineers retained. Other department appointments have not been announced, the whole division being in the flux of change, according to Kane.

Induced Currents

In an atmosphere of uncertainty over the bureau's policy since April when the first drafts of the Ford, Bacon & Davis report were opened, dealers, wholesalers and distributors, manufacturers of appliances, the Electrical Development League and dealer salesmen have lived in fear of what has eventually happened. Plans of all kinds have been held in obeyance.

June, the last month under which the old plan operated saw one of the biggest range and water heater months in Los Angeles history with over a thousand units sold. July sales dropped sharply, August sales are too small to count.

A survey of major department stores revealed them reducing their stocks of electrical ranges; not reordering as many, according to distributors. One leading exclusive appliance dealer said his display used to contain at least 8 to 10 electric ranges, 3 or 4 gas. Now he has 3 electrics, 8 gas and when the electrics are moved, doubts if he will reorder.

Already higher in price than gas ranges the new wiring policy requires adding to the price of the electric range an additional price handicap. The new service policy increases sales and delivery costs. Most damaging of all, said this dealer, has been the destruction of public confidence in the electric range business because of derrogatory statements made over the radio and in press interviews by members of the new board.

("This division," declared Fawcett in a radio talk, "without regard of cost, campaigned for appliance sales using scandalously wasteful high pressure methods. . . . Great numbers of solicitors, salesmen, demonstrators and other so-called contact men got in each other's way while 30 or 40 impressively titled home economists were expensively retained to tell housewives all about electric stoves.")

Gas company, with the greatest break in years, launched a fall gas range campaign offering "Double allowance sale of CP gas ranges, trade-ins $20 to $35.

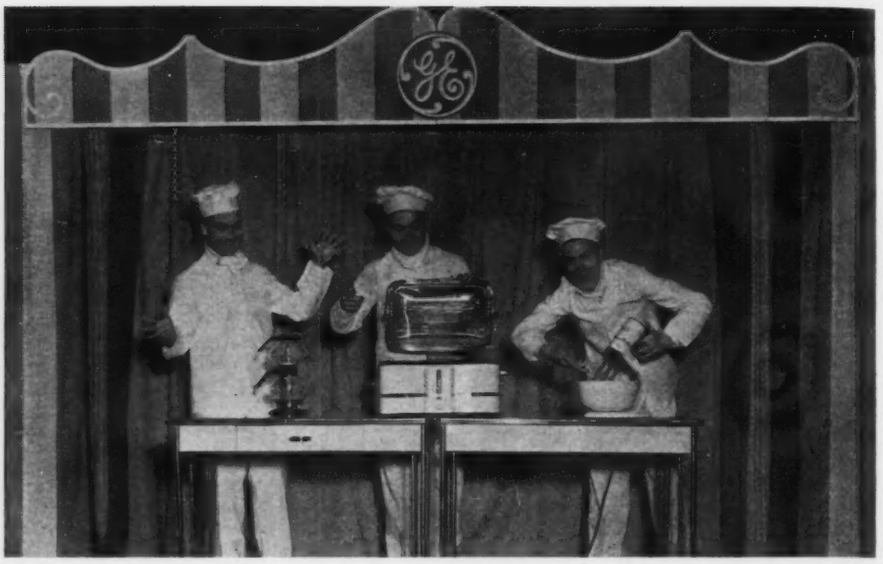
Conference

Utah Power & Light conducts two-day session on policies

Utah Power & Light Co. recently held a two-day sales conference in Salt Lake City when the dealer sales promotional personnel was given complete instructions as to the new policies of the company. Program was under the direction of W. A. Huckins, company sales manager, and competent speakers on phases of the new selling procedure and how they could best be of help to the dealers in the territory were presented.

Speakers included Mr. Huckins who outlined the job of each member of the group; a discussion of the development of "Better Living with Cheap Electricity" was presented by advertising and sales promotion manager, M. L. Cummings. Other speakers included Ken W. Browning, assistant to Cummings, who outlined the objectives of selling residential and farm service; Jacob A. Kahn, intermountain district manager and vice-president of the General Electric Supply Corp., who gave the distributors' angle of the dealer-utility program; J. F. McAllister, manager of residential sales for the utility; Miss Nancy Finch, assistant to McAllister.

Art Schanuel, field representative for the National Adequate Wiring Bureau and Elias J. Strong, manager, Electrical League of Utah, outlined the Adequate Wiring program; Schanuel from the national standpoint and Strong the work being done locally. Other speakers were Olin Ririe, personnel department, Utah Power & Light Co.; L. W. Nims, special military liaison officer; Ralph Neilson, accounting department; John Evans, art department; and Roy H. Ashworth, general superintendent, who outlined the new policy of services and repairs departments.



ONE OF FOUR travelling units is this General Electric appliance and merchandise department trio of "chefs" who are presenting a dramatic story on new small appliances to distributor-salesmen groups in 43 cities. Meetings in the Pacific West which headlined this show were held in San Francisco, Portland, Seattle, Salt Lake City, Denver. A. C. Sanger and S. M. Ford, manager and sales manager, respectively, of G-E's heating device section, headed the troup

Sales Up

Despite the war, Vancouver reports appliance boom

Increase of slightly over half a million dollars in electrical appliances sales by the retail trade in the Greater Vancouver and Lower Mainland area of British Columbia during the first six months of 1940 has been recorded. Every electrical dealer has shared in this gain in business. In the Victoria and Vancouver Island the gain has held the same ratio of increase.

Possibly the best gain in any one field is in refrigerators. Quota of sales for the current year set up by the central station in its dealer co-operation campaign for 1940 was 2010 sales in the Lower Mainland. This total consisted of 1550 sales for dealers and 460 for the utility. Already this total of 2010 has been surpassed.

One refrigerator distributor last year sold three car loads of refrigerators, whereas by the end of August this year he had already taken delivery of 14 carloads of refrigerators and moved them all to the trade. Radio distributors doubled and trebled their radio orders from manufacturers in many instances.

In the refrigerator field it is believed the changes in the price structure of domestic refrigerators, and the enormous amount of both local and national advertising was responsible for much of the sales gain. Vancouver dealers are reported to have used more refrigeration space this year than at any time in history.

● TWO-TO-ONE is the ratio of sales of electric refrigerators, E. F. Meise, merchandise sales manager of San Diego Gas & Electric Co., reported. In other words, two of the low-priced models of refrigerators have been sold during the eight months of the year to each higher-priced model. The ratio of higher-priced models is considered good in view of the price emphasis on the lower models.

A STRIKING USE of advertising on the reverse side of customers' bills-statements by an electric utility was developed by Harvey W. Edmund, sales manager of Coast Counties Gas and Electric Co. Atmosphere photographs supplied by manufacturers make an inviting sales presentation here of electrical products. While the idea is not new, this effort is highly successful largely because of its simple copy and effective photo atmosphere

tment
outor-
held
Ford,
troup

l of

year
tors,
year
f 14
oved
ribu-
radio
many

ieved
e of
enor-
ional
much
alers
re-
any

es of
mer-
Diego
other
ls of
the
gher-
gher-
d in
ower

verse
elec-
W.
Gas
raphs
viting
ducts.
rt is
its
phere

ELECTRICAL WEST

SALES GUIDE

PROFIT CONDITION

Your Lamp Sales

Difference between "accommodation" and "profit" lies in having something catchy to step up the sale. Ordinary lamp bulbs are the accommodation business of your store. To catch profit, the Light Conditioning adaptor equipment is ideal. You could hardly find a line to sell that has so much in your favor.

Every home needs it. It costs so little everybody can afford it. A twist of the wrist installs it. People can buy it and take it home and use it that very night—no waiting. They can fix up one room or one fixture at a time, or all at once, as they choose.

Either way offers you more profit from the lamp sales you make, plus profit from the adaptors.

The average home can use 3 or 4 lamps just to fill empty sockets. To replace lamps of wrong wattage it can use from 10 to 18 more. Lamps for a few more portables could take 5 to 10 more. That gives you a lamp bulb market per home worth **talking** for.

Every home can easily use 10 to 15 adaptor units, shades, conversions. Most of them could make good use of 4 or 5 pin-to-the-wall lamps. Once the appetite is whetted for adequate lighting a home can use 4 to 6 I.E.S. lamps and other portables.

INCANDESCENT LAMPS

OCTOBER 1940

Copyright 1940 by Electrical West, 68 Post St., San Francisco. All rights reserved including permission to reprint in whole or in part

OH, BY THE WAY—

"Have you seen these..."

A split-second remark to step up into Light Conditioning

When the customer comes in for a new lamp bulb of course you can sell her one without even opening your mouth. Prices are marked, bulbs can be in open bins. A wooden Indian could just sell lamps that way. But that is neither fun nor business. There is real pleasure, as well as profit, in selling good lighting equipment, in helping to make sight-savers out of some of the fixture atrocities in the average home.

The lamp bulb buyer may be in a hurry, may not want to be bothered to listen to sales talk. Your opportunity to test him or her is a matter of a split-second. What you say can't be very complicated. It must appeal to their well-being or advantage in a flash.

One question will do it. It will give you a quick clue as to whether you can say any more. Just say, as you take the lamp to wrap it—

"Oh, by the way—have you seen these new sight-savers?"

If her attitude indicates that she does not want to be bothered, just close the incident by leaving a tantalizing thought with her.

"I know you are in a hurry right now but come in some time, if you have a minute. These sight-savers are the first thing I've seen that offer a way to do something about the old lighting fixtures in a person's home. You'll be pleasantly surprised. Thank you for coming in for the lamp."

SUGGESTED BY

In many cases this may open the way to an immediate demonstration. If not, what you have just said has planted a very potent seed. The idea that something **can** be done with the old fixtures after all will keep on working.

To the customer who does linger a minute to see what you mean, it is best to plunge right into light conditioning from this angle. It is the customer's own language.

"Have you ever seen anything easier than this to bring you so much good? Just slip the bulb into the shade adaptor like this, a twist of the wrist, and you can light condition an old floor lamp, or like this, a ceiling fixture. Nice thing about these is that they don't take any wiring or bother. Give you so much more comfortable seeing, too."

Other advantages to point out, if you have time, are these; they are all effective in making the customer want the better lighting it promises:

The cost is so small and the benefit so great. Larger lamp sizes now cost no more than small lamps. Lamps give 27 times as much light as they did 16 years ago. Electric rates never were so low.

Show how the shades diffuse and redirect the light, how the silver bowl lamp with an adaptor is really a little indirect lighting fixture in itself, how modern and up to date it makes old fixtures appear.

That's all the sales talk you need—common sense, lamps and devices that appeal and render a really humanitarian service to poor abused eyes, and a few words to combine them into a better sale of better light.

YOUR SALES ALLIES

PUGET SOUND POWER & LIGHT CO. . WASHINGTON WATER POWER CO. . PORTLAND GENERAL ELECTRIC CO. CALIFORNIA OREGON POWER CO. . UTAH POWER & LIGHT CO. . IDAHO POWER CO. . THE MONTANA POWER CO. ROCKY MOUNTAIN ELECTRICAL LEAGUE

HERE'S AN IDEA

Just make it easy to buy, easy to see, easy to demonstrate, easy to install in their homes

Best thing about this light conditioning idea is that it doesn't take much investment. Ask your wholesaler or lamp supplier to get you set up. There are a variety of display kits and counters such as that shown below. Essentially they consist of a counter to be loaded with lamp bulbs of all kinds. Side shelves are there on which to display a variety of the adaptor shades, bowls, etc. Overhead is a ceiling from which the socket adaptors and a lighting fixture can be hung to show how it can be converted.

Put it in a prominent place. That's just good sense. Lamps are something everybody always needs. Seeing an inviting display reminds them. Everything is handy in one spot to demonstrate an adaptor as you pick up a lamp bulb to sell.

Carry in stock in addition to the usual standard sizes of lamps some silver bowl lamps of many sizes, three-light lamps, projector flood or spot lamps, fluorescent and lumiline lamps. The adaptor stock should include kitchen enclosing bowl adaptors, plastic and silver bowl lamp adaptors, ceiling fixture plastic, parchment or metal shades, bridge lamp modernizers, old floor and table lamp modernizing bowls, pin-to-the-wall lamps.

Surveys show that most average homes can use as many as 7 or 8 clip-on adaptors per home, 4 or 5 single socket adaptors, 3 or 4 conversion bowls and 4 or 5 pin-to-the-wall lamps.

Sending business your way this fall and winter will be one of the year's biggest advertising and radio campaigns. Not only national lamp advertising, IES lamp national advertising, but local utility advertising too in the papers in your town. Make your store the place where people can satisfy the desire for better lighting, stirred up by all this publicity and advertising.

YOU MIGHT TRY

Campaigns

Utilities and bureaus dig in for new seasonal sales

There's plenty of activity on the western front this fall with nearly every utility engaged in one kind of promotion or another. All are tuned to buying trends and intend to put appliances, major and minor, in thousands of homes before Christmas.

Idaho Power Co. (Electrical Equipment Assn.)—Divided into two sections, the "Brick House" (1500 bricks to finish) campaign is under way and will run until Dec. 24. Modern electric cooking and automatic electric water heating is being featured for southern Idaho and eastern Oregon homes. Other campaigns include the "Anti-Bulb Snatchers," an all employee company activity on lamp bulbs; the "Lights Up" campaign on better lighting. These three campaigns are being supported by aggressive newspaper, radio, billboard and direct mail advertising.

Modern Kitchen Bureau—Electric water heater promotion for fall continues. Catchy advertisements of the Donald Duck theme are appearing in BETTER HOMES & GARDENS, plus a colorful array of material for dealers use. Electric range campaign theme of "Alice in Wonderland" is meeting with plenty of dealer enthusiasm. A quota of 100,000 ranges has been set. A total of 22,000 "Alice" broadsides were sent to electrical dealers and utilities, while advertisements were featured in national magazines. Window banners, radio, direct mail were other media used.

Nevada-California Electric Corp.—Range and water heater campaigns set for November.

Pacific Gas and Electric Co.—Electric washers and ironers featured through September with extensive industry campaign by the Electric Appliance Society. Radio announcements, special dealer display material, and salesmen's prize contests were presented. Newspaper advertising support was given by P G and E in over 250 papers in northern California. Good lighting practices were also supported.

Pacific Power & Light Co.—Fall light conditioning program introduced to dealers. Because of obstacles encountered in radio show test, this promotion will not be held this fall. Extensive newspaper advertising was used.

Puget Sound Power & Light—Light conditioning campaign for Oct., Nov. and Dec. Dealer range activity, Oct. and Nov.

Southern Colorado Power Co.—Range and water heater campaign, mazda lamps and IES campaigns scheduled for October.

Utah Power & Light Co. and The Western Colorado Power Co.—Light conditioning (residential and commercial), range and water heater campaigns to be run this month and through November.

Washington Water Power Co.—Fall lighting campaign for three months, beginning October. IES lamps, bulbs and adapter units also to be promoted.

Sales Training

Classes held by Electrical League of Utah in Salt Lake City

Continuing its program of industry education, the Electrical League of Utah is sponsoring a sales training class for appliance retailers and wholesalers. The program is under the supervision of the adult education department of the Salt Lake City Public Schools, being held at the TRIBUNE-TELEGRAM auditorium each Tuesday morning from 8:00 to 9:00 for a twelve week period.

Instructor is competent sales analyst and sales counselor, Walter E. Elieson, who has just returned from Chicago where, during the summer months, he has acquainted himself with a most highly successful method of sales instruction at one of the country's largest sales counselor organizations.

APPLIANCE SALES REPORT, 1940

A Summary of Dealer and Utility Reports Compiled by Associations, Societies, Bureaus, or Dealer Contact Departments of Utilities

REPORTING COMPANIES	Idaho Power Co.	Northwestern Elec. Co.	Montana Power Co.		P. G. & E. Co.		Pacific Power & Light Co.		San Diego Cons. G. & E. Corp.		Southern Calif. Edison Co., Ltd.	Utah Power & Lt. Co.		Wash. Water Power Co.
		Aug.	Curr.	6 Mos.	Curr.	6 Mos.	Curr.	7 Mos	Curr.	6 Mos		Curr.	5 Mos	
Ranges		673			527	3,159	244	1,474	59	320		370	1,740	
Water Heaters		239			297	1,917	146	924	45	290		66	442	
Air Heaters, aux.					96	869								
Air Heaters, 220					96	2,967								
Refrigerators		1,132			9,133	52,915	1,214	6,747				1,946	6,975	
Dishwashers					25	164						2	15	
Washers		869			4,027	24,171	545	4,184	450	3,075		721	4,505	
Ironers					611	3,605	55	320	65	485		65	363	
Vacuum Cleaners		806			2,796	20,394	173	1,126	250	1,810		514	2,759	
Radios		2,482			11,764	80,421	1,000	7,842	1,200	6,825		1,218	8,098	
Mixers					301	2,640			100	700		88	718	
Cookers, Casseroles									70	430		8	79	
Irons									625	3,450		753	4,744	
Waffle Irons									135	860		294	1,722	
Toasters									550	2,750		201	1,930	
Table Stoves		2,525							75	650		495	1,469	
Heating Pads									50	730		37	1,378	
Curling Irons												27	475	
Coffee Makers												102	736	
Sewing Machines					690	4,317						92	751	
Clocks									135	825		221	1,409	
Fans		226							575	3,250				
Floor Polishers												2	38	
Sun Lamps														
Reflector Lamps														
Misc. Lamps														
Shavers														
Yard Lights												39	274	

SOURCES

[1] Figures compiled by Electric Equipment Sales Association. Include power company sales of all reporting dealers for 3 months.

[2] Lists appliances sold by dealers in Portland area. Figures compiled by Northwestern Electric Company.

[3] Combined dealer and company sales from report of Montana Power Co.

[4] Figures are being consolidated with San Joaquin Power and are not available this month.

[5] Gathered by Bureau of Radio and Electric Appliances of San Diego County. Estimated monthly sales figures used in this table: Miscellaneous figures include fans, curling irons and sun lamps.

[6] Includes reports from dealers on San Joaquin Valley system of company as well as Southern California areas served.

[7] Includes Utah Power & Light Company territory in Utah, Idaho and Wyoming. Also Western Colorado Power Company territory.

Wiring Makes the Headlines

Nineteen cities in Washington and Idaho cooperated to total 22 pages of newspaper ads, stories and pictures on Adequate Wiring when industry got together

By Homer C. Bender

FROM a cold start, the Washington Water Power Co. has warmed up to an extensive adequate wiring program, and by organized effort has created enthusiastic acceptance throughout the Northwest, an extremely wide field.

Contractors, jobbers, utilities, and publishers have banded together in a drive that is amazing wiring experts. The newspaper advertising that is tying in with this promotion is being compared to a land boom.

Adequate wiring has been under way in Washington Water Power territory only a little over a year. As new appliances were added to company lines, the need for an AW program became great. Roaster campaigns, for instance, were successful as far as actual selling was concerned, but fell flat when it came to load-building. Customers were even returning such appliances to the company. Ordinary light sockets were inadequate to provide energy. There was a resultant loss of effort, advertising, and revenue.

On January 1, 1939, customers of Washington Water Power were averaging 2060 kw. per year. The company realized that wiring standards of twenty or thirty years ago had fallen far below present-day needs. And so, it became important for the utility to establish contact with jobbers and electricians, and to this group, point out advantages of a wiring program, direct new business to their doors, enlist their support.

The success of these contacts is history. Twenty-two communities out of twenty-four made adequate wiring a special event in their various activities. The first year showed a 500 percent increase in adequately wired homes, and this year promises even a greater percentage.

Tying in with the National program, Washington Water Power began its program by appointing an adequate wiring supervisor. He saw publishers, contractors; called meetings; helped sales people; and secured customer requests for adequate wiring plans.

A group in Spokane was organized. Officers were elected, with the utility representative acting as secretary. Meetings were held every two weeks and a definite program laid out. An immediate project of triplet homes to be opened to the public was adopted. No program was started without a certified home serving as the base of the promotional activity.

Newspaper publishers became the transmitters of good news about adequate wiring. Naturally, editors of local papers were enthusiastic about a program that brought them new business. Double-page spreads appeared throughout the journals of the territory —pictures of the new homes, explanation of wiring needs, and numerous contractors' ads identified them with the program.

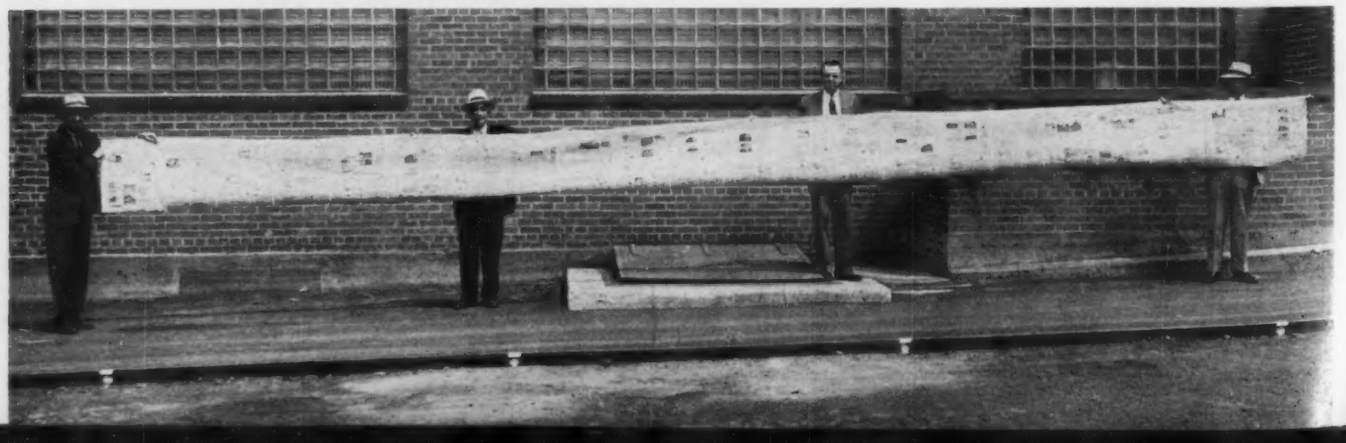
Within a period of six months, a total of 22 full pages featuring certified wiring, news pictures and stories of AW homes was obtained in a cooperative push covering 19 cities.

In addition to advertisements by the Spokane bureau, there were paid ads of 46 contractors, 8 electrical supply companies, 7 lumber and building material dealers, 6 builders, 4 appliance dealers, 2 banks, and 1 hardware dealer.

An editor in one locality urged homeowners to write to the Adequate Wiring Bureau for plans, free inspection, and general information. News stories about wiring dotted his paper. With utility help, hardware stores and electricians followed with advertisements, mostly new business for him.

Residential salesmen of Washington Water Power also supported the drive. The utility made it to their advantage to sell certified wiring jobs along with electrical appliances. Definite EAR was each certified home was given. Public interest was also gained by publicity such as offering prizes to architects for plans on a low-cost home. One contest involved a home in the $4,000 class, and required that wiring be equal to standards adopted by the National Adequate Wiring Bureau. The winning architect stated that following such a definite wiring plan, he was able to meet the specifications for only $2 more than for an inadequately wired home.

R. B. McElroy, general sales manager, Washington Water Power, declared that the plans are being worked out whereby homes that are being remodeled will be provided with adequate wiring. "There is no unfavorable reaction to this entire program," he said, "because everyone is benefitting—the public, the contractor, the industry."



Pasted in one banner is the total advertising done by contractors, utilities, suppliers. H. C. Bender at left, Art Schanuel of NAWB at right

ELECTRICAL WIRING SPECIFICATIONS

1.—GENERAL

The specifications on this sheet and the reverse side of this sheet are not intended to be complete as to every detail, but are prepared in order to insure that the owner will receive a good wiring job, that all outlets and conveniences are included that are desired, and that each contractor's bid submitted shall be on an equal basis providing for the 4 Aces of good wiring, i. e., 1—Safety, 2—Economy, 3—Convenience, 4—Adequacy.

2.—CODE, PERMITS, AND INSPECTION

All wiring shall be equal to that required by the National Board of Fire Underwriters and the state and municipal divisions having jurisdiction. Permits and certificates of approval shall be secured from the above agencies where such are required, and all fees for permits and certificates shall be paid by the contractor. All service and metering equipment shall meet the approval of the utility that furnishes electrical energy. All materials shall be new and shall have the label of and be listed by the Underwriter's Laboratory, Incorporated.

3.—SCOPE OF WORK

The contractor shall install all outlets specified, such as for range, fan, clocks, radio, signal system, pilot light, switch positions, etc., and shall equip these outlets with necessary switches, receptacles, cover plates, and all other necessary items to make a finished job, ready for fixtures.

4.—FIXTURES

The contractor shall include the sum of $ ..... in his proposal as the cost for lighting fixtures only. The owner will select the fixtures that are within this price range. If the owner selects the fixtures from the stock submitted by the contractor, then the contractor shall install such fixtures at no additional cost. If the owner purchases the fixtures from a supplier other than the contractor, then the owner shall install the fixtures at his own expense. This arrangement is necessary since there is a wide variation in the type and construction of fixtures. All lamp holders, drop cords, and sockets are to be classed as fixtures.

5.—MAIN DISTRIBUTION CENTER

The contractor shall designate in the following tables the make, type, and size of equipment he proposes to install:

ITEM	Make	Cat. No.	Surface Flush	Location
1—Meter Trough				
2—Main Distribution Cabinet A—Fuse Type				
B—Multi-breaker type				
C—N-A-S-H Circuit Breaker Type				
3—Water Heater Switch				
4—Main Switch 60-Amp. 100-Amp.				

LIST OF CIRCUITS IN ABOVE DISTRIBUTION CENTER

Item	Amps. Etc.	Appl.	Power	Range	Water Heater	Space Heater	Spare	Remarks
15 Amp.	1-Pole							
	2-Pole							
20 Amp.	1-Pole							
30 Amp.	2-Pole							

6.—COPPER CIRCUIT CAPACITY

The contractor shall designate in the following table the number of feeders, the number of branch circuits, the size of wire, and the type of wiring which he proposes to install. While the minimum requirements are mandatory because of safety, they may not be adequate and it is recommended that: (Owner check those items contractor is to include.)

(1) One lighting branch circuit be provided for each 500 square feet.
(2) One or more 20 or 25 ampere power branch circuits be provided for motor and other power outlets with no lights off this circuit.
(3) One or more branch circuits be provided for future use, and that these be stubbed to junction boxes in attic and basement.
(4) All branch circuits be not less than No. 12 gage wire at least to point of first outlet on circuit.
(5) Range circuit be Not Less than No. 6 gage wire.
(6) That non-temperable plug fuses or automatic circuit breakers be used on branch circuits.
(7) The wiring contractor shall (Shall not) notify the Telephone Co. when to proceed with their telephone wires.

TABLE

ITEM	Number	Size	Type of Wiring
Service Entrance Conductors			
Lighting Branch Circuits			
Power Branch Circuits			
Water Heater Circuit			
Range Circuit			
Others			

(Under Type of Wiring specify whether, 1—Knob & Tube, 2—Non-metallic sheathed cable, 3—Armored cable, 4—Electrical metallic tubing, 5—Covered neutral).

7.—WIRING DEVICES

The following wiring devices are of standard grade, and can be procured by all contractors. Whatever make is designated, then all items shall be equal in every respect to the numbers specified. If the contractor is furnishing any other make or grade of items than listed he shall specify name in blank column.

	Bryant	Hubbell	G. E.	P & S	N & H	Arrow	Make	No.
Wall Switches 1P	3901	1201	3041	1015	1601	6444		
Wall Switches 3W	3953	1203	3514	1535	1681	6446		
Wall Switches 4W	3904	1204	3513	1366	1684	6447		
Conv. Outlets	6311	9090	2679	1526	19139	7913		
Conv. Outlets Triplex	IL-1325	1120 1121	X-245	5325	TL-555	TL-556		
Range Outlets	3826	7979	3088	3826	7988	7909		
Clock Outlets	3826-7	7797	3942	1524	7797-C	7797		
Radio Outlets	3887		3097	1522	3189	7544		
Floor Outlets	3790	7795	V3LL	1533	7795	7795		
Box Lamp Holders	31127	3923	135	61	3960	61		

8.—MISCELLANEOUS

Unless otherwise specified, all wall outlet boxes mounted with long dimension vertical and centered at following heights above floor: Convenience 12 inches. Switches 48 inches. Lighting brackets 66 inches.

Signal System shall be installed in kitchen or as directed, including bell and buzzer, or chimes as ordered by owner. Use flush mounted items where possible and place transformer near distribution center. Use signal wire No. 18 gage and preferably rubber covered.

9.—ERRORS AND OMISSIONS

The contractor shall examine the plans of the buildings and shall report to the owner any omissions or errors that he shall discover, and shall check the location and position of all outlets, switches, and equipment with the owner.

10.—GUARANTEE

The contractor shall leave the entire electrical system installed under this contract in proper working order and shall, without additional charge, replace any work, material, or equipment which develops defects, except from ordinary reasonable wear and tear, within one year from the date of the certificate of approval for the completed work.

All reputable electrical contractors will fulfill this guarantee.

REMARKS:

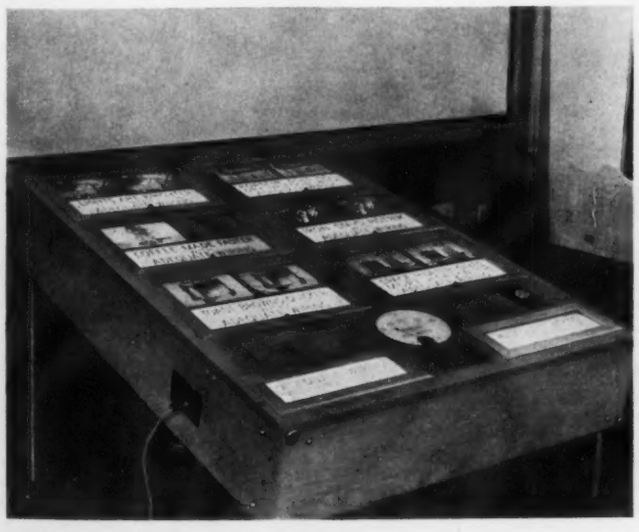
ESTIMATE FOR _____ INDIVIDUAL OR FIRM _____ JOB NO _____
TYPE OF BUILDING _____ CHECKED _____
BUILDING ADDRESS _____ DATE _____
SIGNED BY CONTRACTOR _____ COST _____
ACCEPTED BY _____ DATE _____

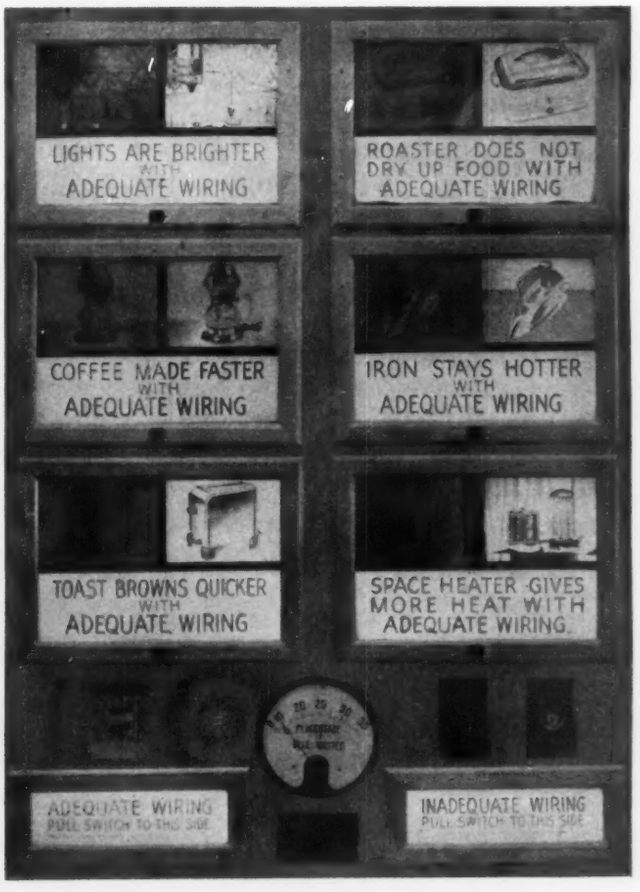
SUGGESTIONS: DOOR SWITCHES - PILOT LAMPS - NO FUSE LOAD CENTER - OUTLET STRIPS - MASTER SWITCH

ROOM OR AREA	SYMBOL	LIGHTING OUTLET Ceil.	LIGHTING OUTLET Wall	LIGHTING OUTLET Spec.	CLOSET LIGHT	CLOSET SWITCH 3-W	CONVENIENCE OUTLETS Duplex	CONVENIENCE OUTLETS Tel. Plate	CONVENIENCE OUTLETS Spec.	WALL SWITCHES 1-P	WALL SWITCHES 3-W	WALL SWITCHES 4-W	CLOCK	DOOR BELL	DOOR BELL SW.	PLATES 1-Gang 2-Gang 3-Gang	CONTRACTOR TO FURNISH ITEMS AS CHECKED BELOW
LIVING																	
DINING																	
BED RMS.	1																Sup. Heater ⊗
	2																
	3																
BATH RMS.	1																Range ⊗ Fan ⊗
	2																
HALLS	1																House Number
	2																
	3																
KITCHEN																	Furnace ⊗ W.H. ⊗
DEN, NOOK																	Soap ⊗
ENTRANCE	1																Washer ⊗ Elec.
	2																Aerial
BASEMENT	1																Floods ⊗ Outlet ⊗
	2																
	3																
ATTIC																	
GARAGE																	
GROUNDS																	
TOTALS																	

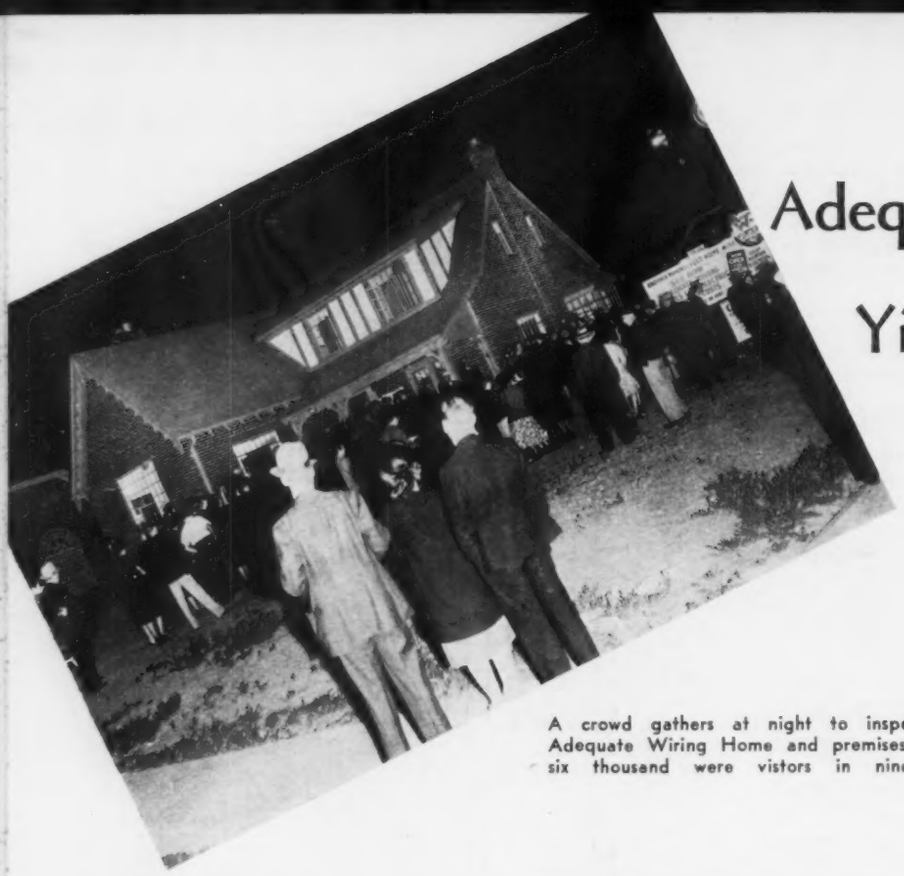
Simplified specification form devised by Bender and now being used by builders, architects, contractors for from one to hundreds of outlets. Makes it possible for the owner, inspector loaning agency to check wiring, it encourages modern methods, improves relations between contractor and owner, encourages owner to provide for more uses, to improve his own job. Lending agencies were shown wiring materials, explained quality and now look for them on job. It has raised standards

Below is an ingenious display board devised by Bender to show at fairs, public meetings, gatherings of any kind. It can be used either on detachable roller mounted legs or stood up on end for lectures. By means of a special switch each panel can be lighted either on one side or the other and readings of voltage on the meter indicate why the lights are dim or bright visibly showing voltage drop effect




LIGHTS ARE BRIGHTER WITH ADEQUATE WIRING
ROASTER DOES NOT DRY UP FOOD WITH ADEQUATE WIRING
COFFEE MADE FASTER WITH ADEQUATE WIRING
IRON STAYS HOTTER WITH ADEQUATE WIRING
TOAST BROWNS QUICKER WITH ADEQUATE WIRING
SPACE HEATER GIVES MORE HEAT WITH ADEQUATE WIRING
ADEQUATE WIRING PULL SWITCH TO THIS SIDE
INADEQUATE WIRING PULL SWITCH TO THIS SIDE

Adequate Wiring Home Yields By-Products



A crowd gathers at night to inspect the Adequate Wiring Home and premises. Over six thousand were vistors in nine days

A MONUMENT to the most perfectly conducted and productive cooperative program in the history of the Rocky Mountain Electrical League is a newly completed dwelling at 4504 Montview Blvd., Denver, built by Carl F. Mahony. Originally intended to direct attention to and awaken interest in Adequate Wiring, this home has proved to be a means of promoting all branches of the electrical industry. A total of 6,134 persons visited the home during a nine-day period; 2,000 of these recorded in detail their newly-acquired knowledge of Adequate Wiring on questionnaires furnished for that purpose. Many of these people requested inspection by the League of the wiring in their homes or advice and counsel in providing proper wiring and other electrical facilities in proposed new homes, thus opening up a substantial amount of new business for manufacturers, distributors and contractors.

Probably the most valuable "by-product" of the Adequate Wiring Bureau's program revolving around the demonstration home was the education imparted to members of the Committee and to scores of others. Distributors, contractors, manufacturers and utility men gave generously of their time in explaining features of the home.

Actual scripts were prepared for these attendants, and rehearsals were held to school these individuals in their jobs. Each of the contractors who were in charge of the demonstration board, which visualized for visitors the advantages of standard voltage over substandard voltage, perfected himself for his particular responsibility.

Typical Day

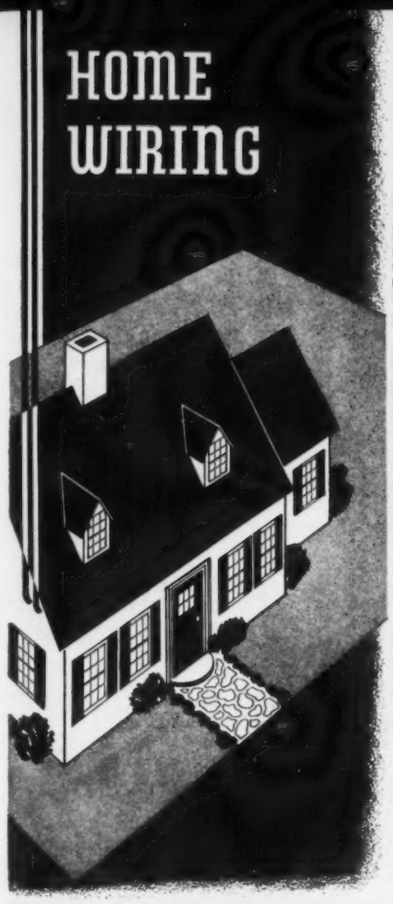
Saturday, May 18.—General criticism during the day of the pull-type lighting units in closets. Attendants report live prospects for Hotpoint dishwasher, one Kelvinator such as displayed in kitchen. Certain sale of two built-in bathroom heaters. Two hot prospects for electric ranges. IES lamps attracted much attention and comment. Also kitchen lighting. Three A-1 prospects for multi-breakers. Lighting fixture inquiries numerous. Frequent comments about outlets matching woodwork and walls. Ten inquiries reached one contractor attendant for home re-wiring jobs. Attendance 632. Weather good.

Financial cooperation for carrying on this home program was excellent. Distributors, manufacturer members of the League and many contractors provided funds necessary to carry on the work, and when the committee found itself short of funds, the Public Service Company of Colorado matched the dollars of other supporters and the program swung along into successful action.

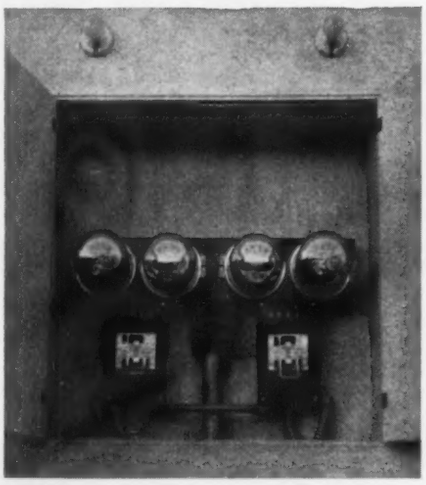
Similar programs are in prospect through League jurisdiction, the Pueblo chapter being first to arrange for vigorous adequate wiring promotion. Adequate wiring was championed at the Albuquerque convention recently and the advantages of demonstration homes stressed. Encouraged by results thus far obtained, several member companies of the League will incorporate in their newspaper advertising, house organs, catalogs and similar publications the adequate wiring story.

The Rocky Mountain Electrical League Adequate Wiring Bureau has been in existence for nine months. Its chairman during that time has been Ralph E. Johnson, Sturgeon Electric Co., who has gathered about him able representatives from every branch of the industry. The success of the demonstration home proves this conclusively.

Charming girl hostesses from the Public Service Company of Colorado who assisted during the demonstration of the Adequate Wiring Home, standing, left to right, Alta Sawyer, Bernedene Tarr, Barbara Weesner, Betty Timm, Oma Bridwell, Elsie Jane Lorenz, Ruth Kraft, Elizabeth Rece; sitting (l. to r.), Harriett Woods, Dora Virginia Drake, Kay Bishop, Dorothy Birch, Ragnhild LeVo



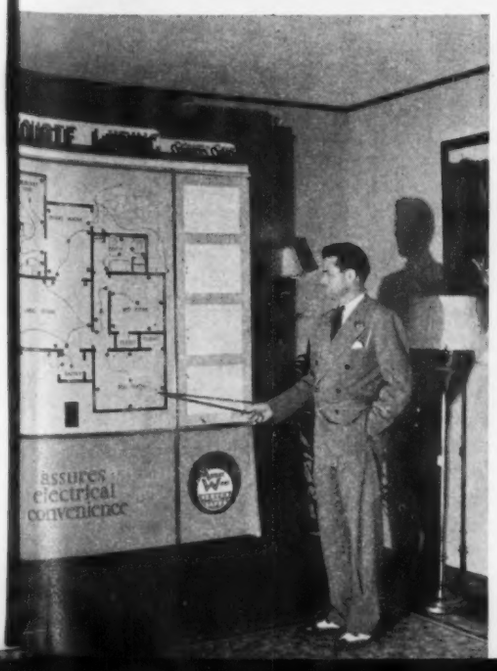
Tangible A-W Progress



ADEQUATE WIRING once was thought too intangible to dramatize, to publicize. But ways have been found to attract attention to it and inform the public. On this page are a few tangibles of Adequate Wiring in the West.

Top, center: Nine certificates are being presented to Mrs. Mary Elzea of Fresno by A. T. Sherman, Pacific Gas and Electric Co. salesman, upon completion of Normandie Hotel Apartments, nine dwellings within a group, all wired to Red Seal certified wiring. With the adequate wiring went adequate lighting, electric kitchen equipment, air conditioning. Publicity given to this electrical group of dwellings has been effective in interesting other builders.

At the top, left, is the cover design of the Electrical League of Utah's adequate wiring folder, distributed, by the way, to more than 8,000 visitors to an all-electric home built by J. Stanley Quick. This general contractor tested a theory by building two almost identical homes side by side, one for $8,950 complete electrically, the other for $7,950, just a typical house. The all-electric home sold immediately, brought scores of inquiries, tangible evidence that adequate wiring is becoming recognized as a tangible need.



Below the home wiring folder is shown a different kind of tangible, a compact standardized service entrance equipment as applied at the huge low rental project in Los Angeles, Wyvernwood. This unit serves two apartments, each having two meters mounted on troughing (for off-peak water heater), a multi-breaker containing a 50-amp. breaker for range, 25-amp. for water heater, 20-amp. for lighting circuits, and 20-amp. spare. Newbery Electric Corp. made them up at the shop, installed them in these inset outdoor cabinets.

Displayed at San Joaquin county fair, Stockton, was this flexible display board for Red Seal wiring designed by D. Heller of PG and E. Side panels, with luminous signs, hinge so that the display can be used in a narrow window. Lights indicating outlets in each room and accompanying panel can be run automatically or manually.

Edward A. Howard, contracting engineer, of Altadena, Calif., at lower right, has become an enthusiast for Red Seal wiring after installing an electric range in his own home.. Now he specializes in adequately wired and electrified homes, even to air conditioning. "Wiring that is adequate costs so little more than inadequate wiring," he says, "that it is one of the smallest items in building." Yet, in his selling, he finds it a fine talking point.

Re-inspection Can Be Done

MANY have been the discussions at contractors' and inspectors' meetings about re-inspection. It bobs up often, is talked about, agreement is unanimous that it would be a good thing, if it could only be done; but seldom does anything result from it all.

Not so in Pocatello, Idaho. There something is being done about it by City Inspector Elmer V. Smith. Just how it is done, and the results from it, should take the subject out of the talk stage into similar action in other communities. The procedure is so simple it may not seem to be enough to get results, but the secret of its success is the approach, the way in which the town is sold on the idea of safe wiring.

In Pocatello an accidental death caused by poor wiring brought a lawsuit against both the city and the power company. This crystalized the support of the mayor and city attorney for the inspector. When the added factor of cutting down fire losses was considered, the program was given strong backing.

Two tags are now used by the inspector in making a re-inspection, one blue, one red. The blue tag is affixed to each portion of the wiring that needs correction. It says:

"*Notice*—Please take notice that your electrical wiring is UNSAFE. Be sure and have this defective and unsafe wiring corrected within 15 days from the date of this notice. Do not remove this notice"—and it is dated and signed by the city electrician.

The red tag is more drastic and is used on extreme cases. It says, "This electrical wiring (or equipment) in its present condition is condemned. Do not connect electricity to these wires." It, too, is dated and signed, and the power cut off at the meter by the inspector.

When the inspector tags wiring, he leaves with the tenant or owner a post card, numbered, with which the owner or tenant is to call his electrical contractor. It states, "I have just received notice that my wiring is defective and must be corrected within 15 days. Please take care of the same for me. To obtain wiring permit licensed electricians shall use this card," and it is signed by the owner or tenant and mailed.

A record is kept of the number of tags left at each place re-inspected and these are rigidly followed up. That is part of the secret of its success.

The approach to the whole matter is most important, says Smith. If it takes an hour to talk to and convince a tenant or owner why re-inspection is necessary for his own protection, take the hour, he advises. Then explain each correction tagged. This leaves a good taste in the customer's mouth and obtains his cooperation.

If he asks the name of a good contractor, he is given a list of all the licensed contractors in town. It does not do to give only a few names and not others. If a contractor asks to have a job re-inspected, the inspector does not tell any other contractor. That is his job. If the owner asks in such a case for names of contractors he merely insists that the electrician be a licensed one.

Condemned jobs get a little more hard-boiled treatment. Power is cut off and immediate correction is insisted upon. In such cases the owner or tenant is told that if he will be prompt in attending to it the city electrician will be just as prompt to pass it and put him in the clear.

One other important factor is that in re-inspection, Smith does not do too many jobs, and he takes all of one kind of business at a time. He started with the lumber yards and inspected all of them. Thus none of them could feel that his was being singled out. Then he took all the furniture stores. Then each of other kinds of establishments.

The constructive nature of it soon got around. A church asked to have a re-inspection. So did a J. C. Penny store, and it was found to be in dangerous condition and completely rewired. A city councilman asked to have his place examined. Eleven tags were put on it, and the job completely rewired. A fire in a food store caused a check of all commercial refrigeration jobs in town, and cleaned up potential fire hazard from one of the most prolific sources.

Adequate wiring publicity of the Idaho Power Co., Smith says, has made it much easier for him. People are more conscious of the need for good wiring.

An interesting angle is that on such re-wiring Smith frankly recommends replacing fuses with non-tamperable fuses or circuit-breakers. And in order to make the city consistent with this recommendation to its people, all city buildings have been equipped with fustats and multi-breakers.

One other kink that Elmer Smith uses is that instead of tagging a new job, he carries a rubber stamp. Before a job can be lathed in, this rubber-stamp mark, signed in ink by the inspector and dated, must appear on the wood itself. A piece of joist cannot be sawed out and taken from one job to another as could a tag.

Re-inspection, talked of so often, wished for by many, feared by inspectors because of political pressures brought to bear to "call it off," seems to work if it is simple and if it is explained or sold to the public carefully as it is in Pocatello.

House to House

Results not encouraging when this contractor tried it

Often a contractor is asked why he does not apply the selling methods of the merchandiser to wiring. So Herbert L. Evans and Howard C. Nicholas, owners of Nicholas Electric Co., Los Angeles, and progressive, alert electrical contractors with a record of industry co-operation, decided to try it.

They decided upon a house-to-house campaign in certain selected neighborhoods in which the possibilities should have been excellent because of the age of the houses, the percentage of home ownership, the saturation of appliances. A household thermometer was used as a give-away door opener to permit the solicitor to make a sales talk on the need for additional outlets. The following is a summary of the activity:

Thermometers given directly to people with sales talk (47 of whom were owners)	123	
Thermometers left at homes—no sales talk	64	
Total thermometers		187
Literature and sales talk (19 owners)	82	
Literature without sales talk.	42	
Total		124
Card, literature and sales talk (250 owners)	276	
Card, literature—no talk	119	
Total		395
Cards above	395	
Cards for office	205	
Cards distributed door to door without endeavoring to gain entrance	1400	
Total		2000
Totals—		
Given sales talk	481	
Literature left at doors	1672	

316 of 481 given sales talk were owners.

Immediate results, according to Evans, were practically nil. He did feel, however, that the effort was good advertising and that in longer-range results it might eventually prove to have been a worthwhile effort. This experience did illustrate, however, that wiring is bought on more deliberation than are appliances which can be seen and immediately visualized.

Short Ends

Briefed news of activities in the wiring field

Two-thousandth certificate for Red Seal wiring was awarded in the San Francisco division when Melvin S. Springer, electrician for San Francisco's department of public works, was handed a certificate by Frank Talcott, division sales manager, Pacific Gas and Electric Co. Witnesses to the event (See Profiles) were J. R. Lazarus, Pacific Coast Electrical Ass'n; Carl Gellert, president, Standard Building Co.; Robert Lindsay, Red Seal salesman, P G and E.; and J. W. Rentz, of Standard Building Co.

A six-room home of the $6,000 class, its original layout called for four circuits—two for lighting, two convenience outlets. Springer wired it with 1¼-in. conduit service, 8 circuits, 19 lighting outlets, 31 convenience outlets, 23 switches—4 of which were sets of 3-way, an electric range outlet, and weatherproof outlets both front and back, outdoors.

FHA Recognition

Electrical Development League of Southern California, after two years of effort, has just obtained recognition from FHA authorities to provide for larger loans where the loan application specifies "certified adequate wiring" in the section of the specifications listing types of materials to be used. The increase permitted would be to cover the cost of doing a good job under certified adequate standards, according to announcement made at the Inspectors convention at Santa Barbara by Arthur Kempston, representing the League.

"We have been getting on the job too late to get adequate wiring specified before," said Kemptson. He emphasized the need to publicize to all prospective home-owners that the cost of a certified job would now be made part of the loan and that inspection to determine adequacy certification would be furnished by the industry. Similar action to get the support of building and loan groups to do likewise was recommended.

New Booklet

As amended Aug. 9, 1940, two ordinances of Los Angeles County have been issued in a comprehensive little booklet for the guidance of the trade in Los Angeles County. It is interesting to note that in addition to electrical inspection in unincorporated parts of Los Angeles County, the incorporated towns of Azusa, Glendora and La Verne have also arranged to have inspection under the County system.

The Electrical Ordinance covers the details of inspection and applications and permits, fees, penalties, etc. Wiring, it provides, shall be in accord with the National Electrical Code and the safety orders of the Industrial Accident Commission with a minimum of extra rules, mostly setting wattage limits.

The second ordinance incorporated in the booklet is that of qualification of electricians, examination procedure, certificate provision, appeals, permits and penalties. Between the two ordinances there are several diagrams to aid the electrician. The booklet was recently edited and issued by Arthur C. Veit, chief electrical inspector in the Department of Building and Safety under William J. Fox, chief engineer.

Wiring Letter

Best sidelight which reveals the effectiveness of the work of the Northern California Electrical Bureau was uncovered last month in a copy of a sample letter sent to all building owners and managers because one reactionary manager was using it to attempt to stem the tide. The tide is best expressed in the report of the Bureau issued at the same time.

It reported that as of July 1, 1939, rewired space in downtown office buildings of San Francisco totalled 303,300 sq. ft. As of July 1, 1940, the total had been raised to 1,151,100 sq. ft., an increase of 280 per cent. This is the letter which seeks to stop this flow of better wiring and lighting:

Dear Mr.

We have noticed that a torchiere(s) has been placed in your offices that contains a 500-watt globe.

To add this to the existing load on the wiring unduly increases the demand on the circuits and the consumption of electricity.

Rental rates and wiring in San Francisco are both based upon a normal load of about 1 watt per square foot. When this is materially increased it becomes necessary to change the wiring and to compensate for increased costs by a charge of $2.50 per month for each torchiere.

If you feel your present lighting is not satisfactory we will be pleased to make a study for you to see if changes can be made to improve the situation.

If you prefer to retain the torchiere we will be obliged to add to your rent $2.50 per month starting ....., 1940.

Yours truly,

● WIRING WILL BE prominent in the story, "There's gold in them thar mountains," which will be given to fourteen meetings of the Pacific Coast Electrical Ass'n in California and Nevada (Story on Associations page 60). The "gold" to be mined from adequate wiring promotion will be illustrated in that lecture.

Reference Job

Stipple lens units used on playground system

With new highs of light intensity and quality of distribution claimed for it, the lighting system just installed at the James Rolph Junior Playground at Army and Potrero Streets, San Francisco, has established design standards for similar installations in that city. Considered a "reference job" by Westinghouse because of the first use of stipple lens units in such an installation, the job is one in which many people cooperated to produce a model installation.

The City and County of San Francisco Recreation Commission, the Public Utility Commission engineers, Pacific Gas and Electric Co., the Westinghouse Electric & Mfg. Co. and the contractors, Pacific Electric & Mechanical Co. as well as Felix Langer, WPA engineer, who contributed design, made it a community enterprise.

On the soft ball field, 84 1500-watt Alzac aluminum reflectors with stipple lens, both of the narrow beam and wide beam type, deliver a foot-candle intensity of 11 ft.-candles in the outfield and 27 in the infield. With the stipple lenses, a less glaring light improves the seeing of the outfielders who must look into banks of lamps.

Tennis courts, volley ball and basket ball courts are lighted with 1500-watt and 1000-watt lighting units to provide a general intensity of 35 ft.-candles.

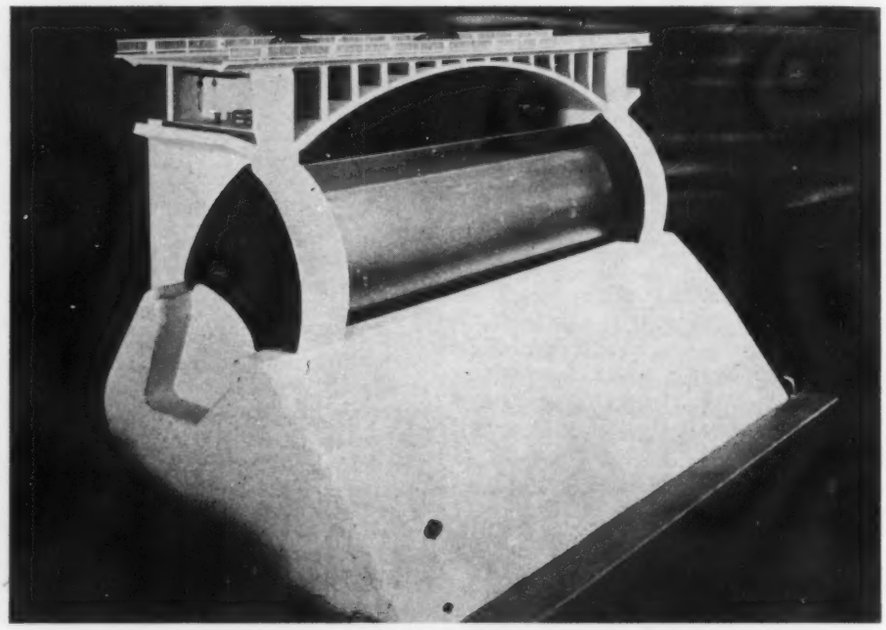
B. C. Report

Vancouver declares increased business despite war

War has not hurt the electrical contracting business in British Columbia. Residential construction in Vancouver has changed. More stable building contractors are in it, and larger electrical contracting firms are getting residential business. The monthly report of the Electrical Service League of B. C. says. "Members generally are busier than they have been for many years and difficulty is being experienced in obtaining skilled workmen."

National advertising of adequate wiring by manufacturers, backed by local ads of power company and jobbers, the League states, is bringing results. The League is swamped with inquiries by letter and by personal visitation, traced to advertising. Residential field men are getting more plans from builders and architects.

Induction Heating Applied to Coulee Drum Gates



Grand Coulee gates are 115 ft. long, 28 ft. high, model shows autos to scale

Tests show superiority of induction system in which 78% of the heat is developed in the iron. Each of eleven 115-ft. gates requires 215 kva. to stop freezing

By Ralph D. Goodrich, Jr.*

TEMPERATURES as low as 28° F. below zero have been recorded along the Columbia River in northern Washington. Because the eleven drum gates at Grand Coulee Dam, which will be used to control reservoir water level, may be called upon to operate in such extreme cold, it was necessary to provide a means of preventing ice accumulation and freezing of the gates.

The situation pointed toward the desirability of a permanent de-iceing system, and several such systems were investigated — including those making use of electrical resistance heaters and the circulation of hot liquids. But extensive tests led to the selection of heating by induced eddy currents. The system has simplicity and permanence.

Briefly, heating by induction consists of passing alternating current through a conductor which is threaded through holes in masses of iron. The current sets up magnetic flux in the iron around each hole, and the flux in turn generates currents in the iron. In the Grand Coulee installation, 78 percent of the total heat is developed in the iron. By causing most of the heat to be developed directly in the iron in contact with the ice, heat transfer from the cable is minimized, and the operating temperature of the copper cable is kept much lower than it would be in a straight resistance unit.

The eleven gates at Coulee are each 115 ft. long and 28 ft. high and recede into chambers in the spillway, making a smooth profile over the crest of the dam. In partially or fully raised position, the gate floats on water in the gate chamber, which is under pressure from the water in the reservoir. A horizontal hinge on the upstream side of the gate holds it in place and allows it to swing from one position to another. Seals on each end of the gate and on the upstream and downstream sides of the chamber minimize water leakage. The end seals bear against the metal pier plates and the chamber seals form close contacts with the skin plates on the gate. An overhanging lip or apron on the downstream side of each gate rests on the metal gate seat which supports part of the weight of the gate (Fig. 1).

Although the same general scheme was used for heating both the pier plates and gate seats, the specific applications in the two cases were different. For the pier plate installation, it was necessary to thread the copper cables through holes in the reinforcing webs on the back of the cast-iron plates. After threading, the cables are embedded directly in contact with the concrete. The heater cables of this portion of the installation are therefore irreplaceable, and in order to insure long life, the insulation used in them is much heavier than would ordinarily be required. The presence of water indicated the use of moisture-resistant rubber, such as is used in submarine power cables.

It will be noticed (Fig. 2) that part of the pier-plate is heated by three cables, while the remainder is heated by only one. The former part is traversed by the overhanging apron on the downstream side, and is normally exposed to the air. This section requires 70 watts of heat per sq. ft. of surface to maintain a temperature of 32° F. when the air temperature is 28° below zero, the recorded minimum. The rest of the plate is protected by the end of the drum-gate when the gate is raised, and would be overheated if the same amount of heat were applied. Designs allow for application of maximum heat when the gate is lowered, and the entire plate is exposed by providing a double-throw switch so that either full or half-voltage may be used.

The heating system of the gate-seat was made replaceable by welding angle-irons to the under side of each heating plate. The raceway formed by these angles is triangular in shape, and after the concrete has set, the plates and angles may be removed, if necessary. The induction heating cables are thread-

* Mr. Goodrich is with the U. S. Bureau of Reclamation, at Denver, Colo.

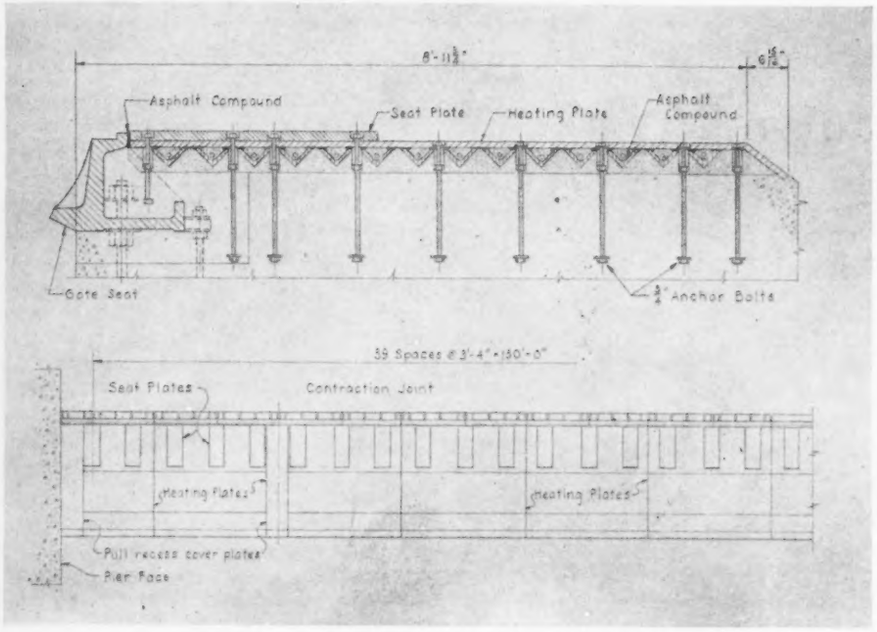


Fig. 1—Above, side-elevation of gate-seat section; below, partial plan

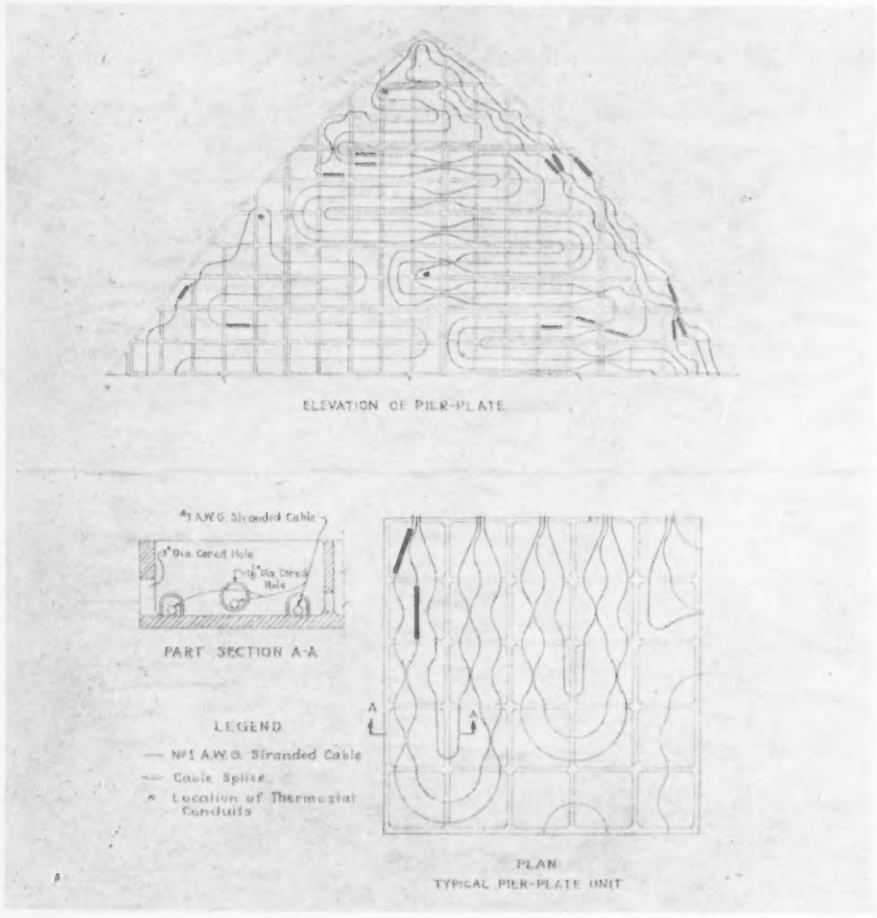


Fig. 2—Views showing arrangement of conductors within a typical pier plate

ed through the raceway, which is afterward filled with asphalt (Fig. 1) to improve the heat transmission.

In view of the fact that heating by eddy currents is rather complicated to analyze mathematically, designs are based on tests conducted on full-sized samples of the pier and gate-seat plates. Initial measurements of eddy-current losses in an iron test ring were deemed unsatisfactory when it was found that the power losses in the supply circuit alone were very nearly the same as the losses in supply circuit and ring together. The error introduced by subtracting these quantities was excessive. To segregate the eddy current losses, separate measurements were made by typical webs of each type on a full-sized sample pier plate. This sample was 6 ft. 3 in. square with 1-inch reinforcing webs crossing the plate both horizontally and vertically at 15-inch intervals. Each test coil linked all the flux that passed through its web, and consequently had the same voltage, in a 100-to-1 ratio, induced in it that was induced in the web. It was possible, therefore, to measure the power loss in the web by means of a wattmeter connected to the test coil and to the copper cable.

Gate-seat tests were conducted using a similar coil, but in this instance only a 1-foot length of plate was used, as the same results are produced by the continuous iron circuit around the cable, regardless of length.

Computations based on these tests indicated that about 215 kva. at 50 volts, 60 cycles, 80% lagging power factor, would be required to heat all of the necessary surfaces of one drum gate. All the heater cables are No. 1 AWG, 37-strand, with 10/64-inch moisture-resistant rubber insulation, through which 250 amp. will be circulated. Although this value of current considerably exceeds the recommended ampere rating for this size of cable in conduits, tests indicate that because the favorable heat-conducting conditions, this current can be safely carried continuously without excessive temperature.

Power is supplied through 6,900- to 50-volt, 60-cycle transformers, especially designed for this service. A total of 22 transformers are used—two for each gate—with high flash-point noninflammable cooling liquid specified to reduce fire hazard. To allow for variations between actual results and tests, and weather colder than anticipated, seven 2½% primary taps are included on each transformer, giving a 17½% range in voltage on the secondary.

Protective and control equipment is designed to withstand the expected high humidity in the galleries of the dam. A submarine-type breaker was specified in the design for the 6,900-volt circuit breaker connected to the primary of each transformer. It is manually controlled, with a shunt-trip coil for automatic tripping. Thermostats controlling automatic tripping are equipped with sealed mercury switches to improve the dependability under conditions of

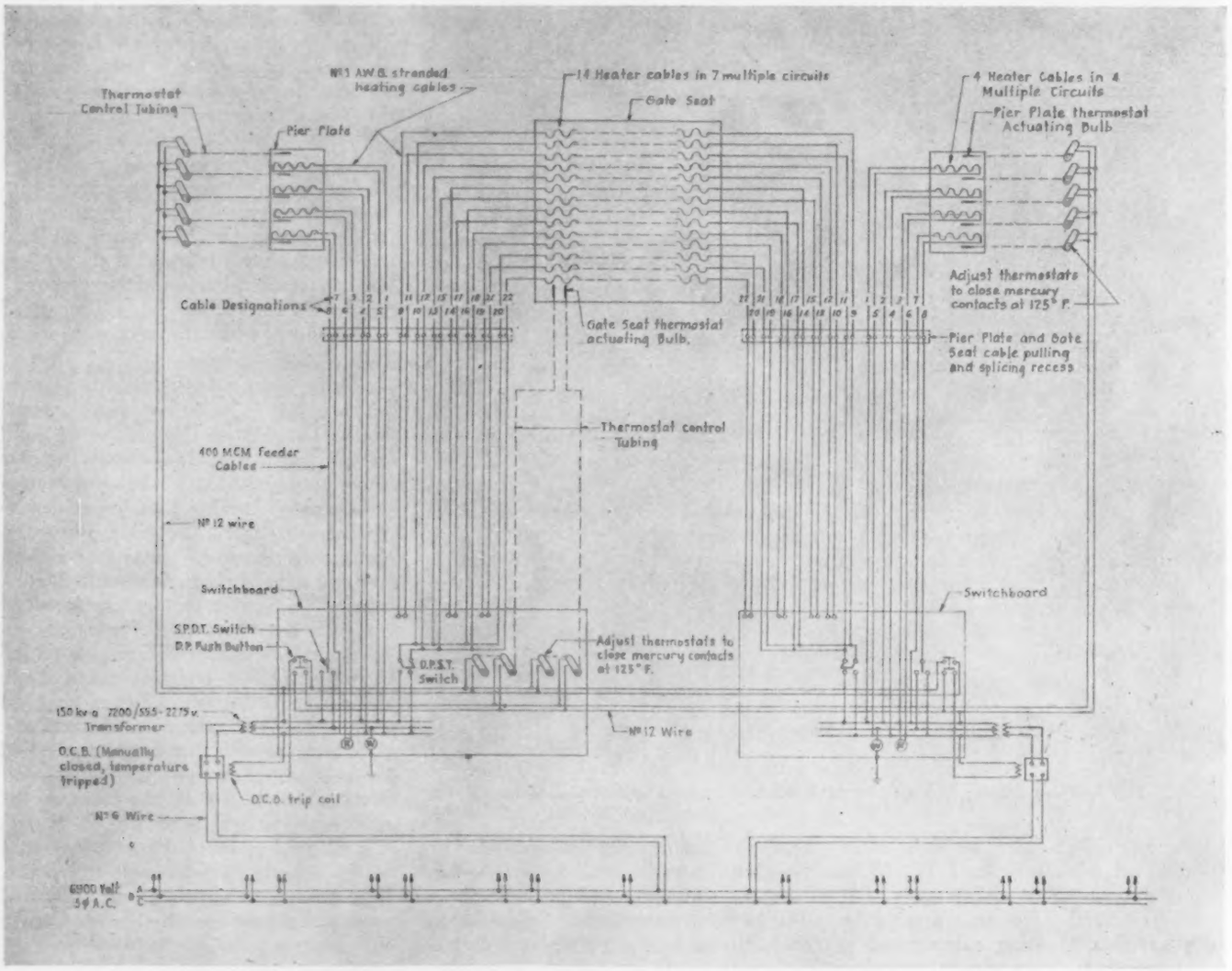
high humidity. The thermostats themselves serve to protect against excessive temperatures in the concrete near the heated surfaces. The adopted safe maximum temperature of the concrete is 150° F. and to allow a liberal safety factor, the thermostats are adjusted to trip the breakers at 125° F. An additional safeguard is provided by equipping the thermostats with manual resets, so that after tripping the breaker cannot be reclosed until the operator has reset the thermostat. Automatic resetting of the thermostats would permit the breaker to be closed as soon as the heating circuit had cooled off, without attention being called to the original trouble. Power for the tripping circuit is taken from the secondary of the transformer, and after the breaker opens, the control circuit is cut off, to prevent overheating the trip coil.

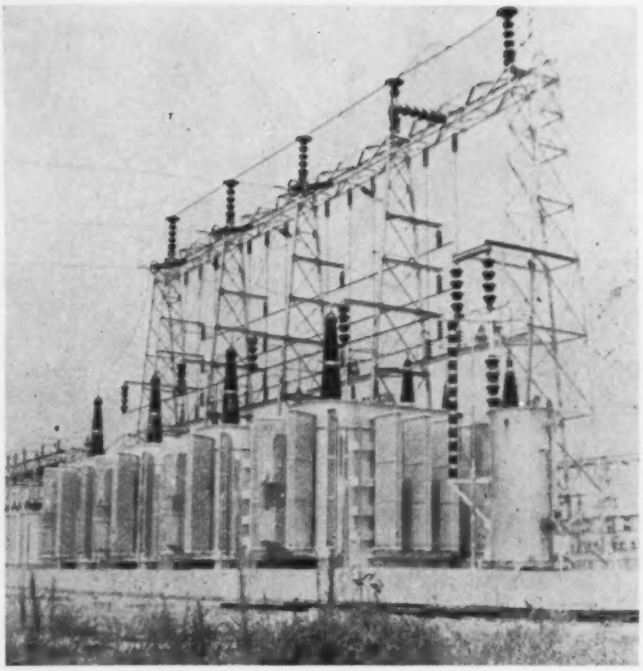
Each switchboard is located next to the associated transformer, and connected to it by a bus capable of carrying 3,000 amp. The switchboard contains a single-pole, double-throw switch for transferring the pier-plate circuit mentioned above from half- to full-voltage; a double-pole, single-throw switch for disconnecting all of the gate-seat circuits when the gate is lowered; a red lamp to indicate when the transformer is energized, and a white lamp to indicate when a heating circuit is grounded and to drain static charges from the secondary circuits (Fig. 3).

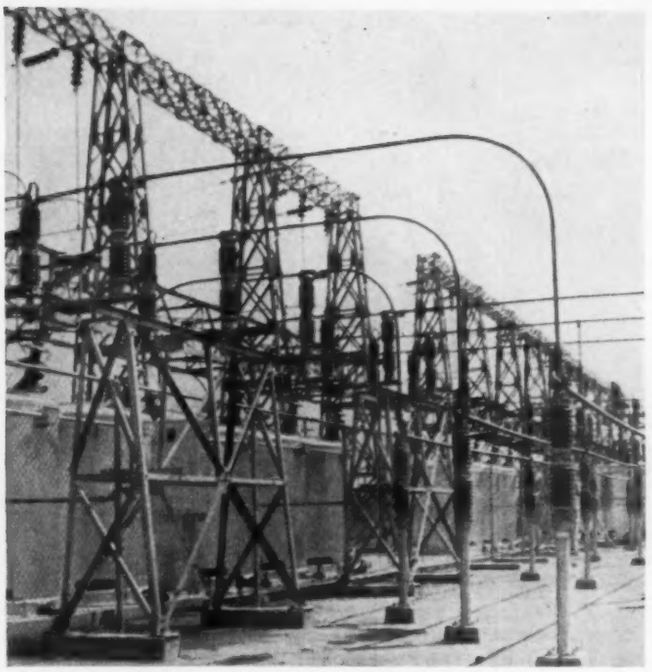
The main advantage of heating by induction is that the greater part of the heat is generated directly in the iron which is to be heated. This eliminates most of the problem of heat transfer, makes possible lower temperatures in the copper cable, and reduces the danger of overheating the concrete portions of the dam. Aside from the power supply and control equipment, the only installation required is threading of the heater cable. The control equipment described could be used with any type of heating installation, and simplicity of design was emphasized in order to keep down the high maintenance costs, normally associated with complicated circuits. So far as is known, no previous designs using induction heating have been made. Because of the importance of the installation, considerable time has been spent on the design, and tests will be conducted during construction to insure that the heater cable is not damaged before the system is put in operation. Field tests will be conducted as soon as possible to check the predicted values of current and power.

The heating system was designed under the direction of H. H. Plumb, electrical engineer. All electrical designs are made under the general direction of H. F. McPhail, assistant chief electrical engineer and L. N. McClellan, chief electrical engineer. All engineering designs are under the general direction of J. L. Savage, chief designing engineer; and all engineering and construction work is under the general direction of S. O. Harper, acting chief engineer, of Denver, Colorado. All activities of the Bureau are under the general charge of John C. Page, commissioner, of Washington, D. C.

Fig. 3—Wiring diagram. Each gate requires 215 kva., supplied through two transformers. A switchboard is adjacent to each transformer


Thermostat Control Tubing
№1 A.W.G. stranded heating cables
Pier Plate
14 Heater cables in 7 multiple circuits
Gate Seat
4 Heater Cables in 4 Multiple Circuits
Pier Plate thermostat Actuating Bulb
Adjust thermostats to close mercury contacts at 125° F.
Cable Designations
Gate Seat thermostat actuating Bulb.
Pier Plate and Gate Seat cable pulling and splicing recess
Thermostat control Tubing
400 M.C.M. Feeder Cables
№ 12 wire
Switchboard
S.P.D.T. Switch
D.P. Push Button
D.P.S.T. Switch
Adjust thermostats to close mercury contacts at 125° F.
Switchboard
150 kv.a. 7200/555-277.5 v. Transformer
O.C.B. (Manually closed, temperature tripped)
№12 Wire
O.C.B. trip coil
№ 6 Wire
6900 Volt 3φ A.C.

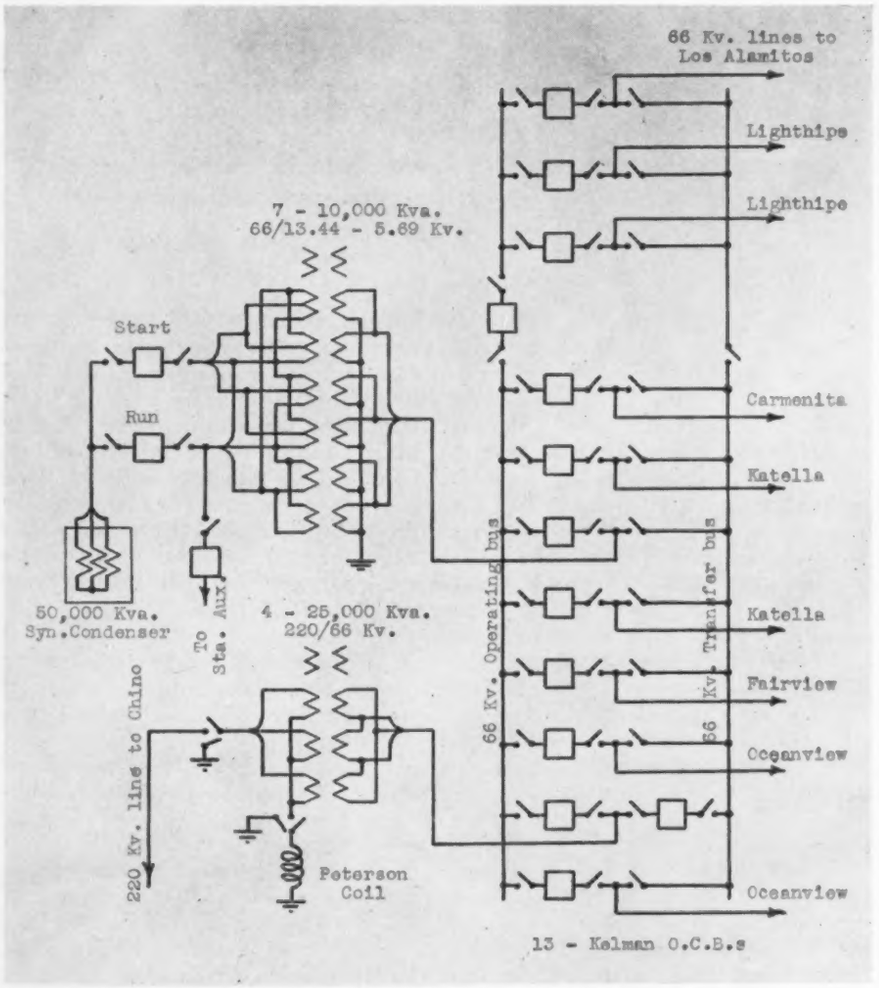




Barre Substation

by A. A. Kroneberg

Edison's second major receiving unit for Boulder power strengthens transmission facilities in southern California

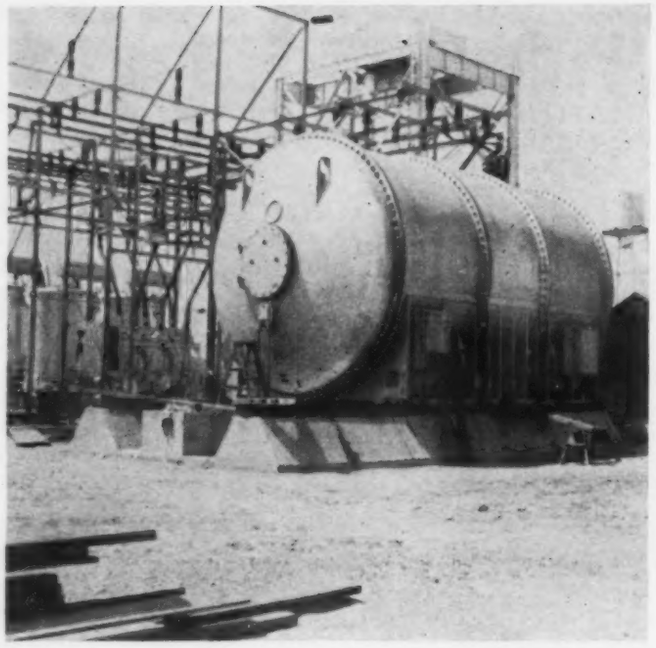


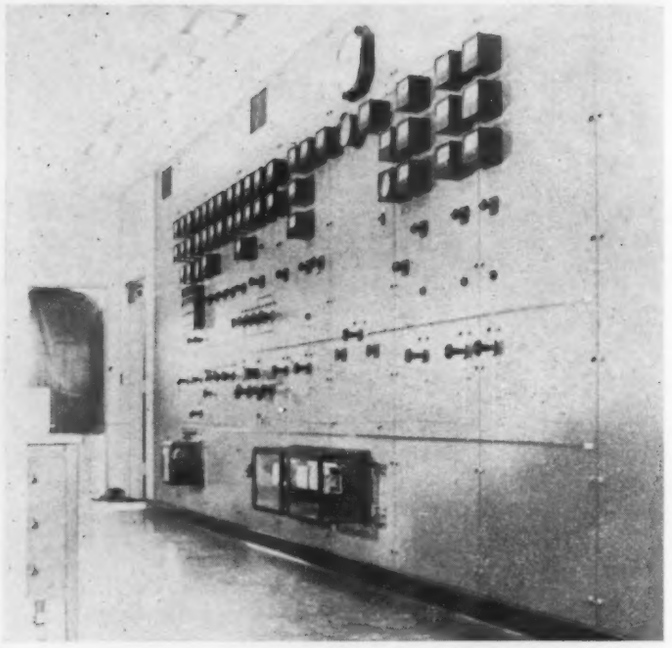
BARRE substation of the Southern California Edison Co. was built to provide receiving station capacity for the second generator installed at Boulder Power House for the use of the Company. The transformer capacity was placed on a 26-mi. extension of the Boulder-Chino 220-kv. transmission line, and was located in the center of the Orange County group of 66-kv. substations.

The initial installation includes a 75,000-kva. 220 Y/66D-kv. transformer bank directly connected to the 220-kv. line extension, an operating and transfer bus arrangement on the 66-kv. side of the transformer bank, a 50,000-kva. synchronous condenser, and nine 66-kv. transmission lines. The ultimate design permits expansion to a double-bus arrangement with 24 switch positions. A ground fault neutralizer or Petersen coil is installed in the transformer neutral as part of the Boulder-Chino-Barre line protection.

The transformers and the Petersen coil were manufactured by General Electric and are identical with those installed at Chino substation which provided receiving terminal facilities for the first Boulder generator. These transformers have a 127/72-kv. full-winding ratio and are designed for 220 Y/72 Delta operation with high-voltage wind-

At top left are transformers and Petersen coil, at right the 66-kv. bus. At left below, how equipment is arranged





At left, the 50,000-kva. synchronous condenser—it is designed to operate as a motor if so needed. Control board at right

ings insulated for 230-kv. at line terminals and graded down to 138-kv. at neutral terminals. Tap changers under load are installed on the low-voltage windings of the transformers giving a voltage control range from 63.36 to 72-kv. in 6 steps. A manual tap changer is installed on the high-voltage windings to provide 200 and 210-kv. reduced capacity windings. The transformers are natural cooled.

The circuit breakers for the 66-kv. busses are modernized Kelman breakers which were available from abandoned 66-kv. substations. These breakers are equipped with new type interrupters and new and faster operating mechanisms. The 66-kv. busses are of the "La Fresa" design and consist of 2-in. outside diam. 14-gage copper pipe, supported on Lapp post-type insulators and concrete pedestals approximately 6½ ft. above ground.

Seven of the nine 66-kv. transmission lines leaving Barre substation feed 66/11-kv. step-down substations in the Orange County area, the other two serving as tie lines between Barre and Lighthipe substations. The latter two lines and three 66-kv. lines between Chino and Laguna Bell substations provide means of inter-connection between the Boulder system and the Big Creek system of the Company. When more capacity becomes available at Boulder these tie lines will be replaced by direct 220-kv. tie lines from Barre to Lighthipe, and from Chino to Laguna Bell. Then the 66-kv. tie lines will be rearranged to feed step-down substations.

The 50,000-kva. synchronous condenser at Barre, together with a similar one at Chino, is used for power factor and voltage control in conjunction with ratio changers, as well as for the control of circulating reactive currents in the loop made up of Barre, Chino, Laguna Bell and Lighthipe substations. It is an outdoor, hydrogen-cooled condenser with a minimum of automatic devices. Both Chino and Barre condensers were manufactured by Westinghouse and are typical of the design of such machinery today. The deviations to be noted are in the mechanical capacity of the shaft which would permit the use of the machines as 50,000-kw. motors and the omission of main field rheostats and breakers. The main exciter is permanently connected to the field terminals. Voltage regulators operate on the field of the exciter. Provisions have been made for reversing the polarity of excitation by reversing connections of the field of the pilot exciter. This was made in order to equalize wear on collector rings and brushes by periodic (monthly) reversals of polarity. The transformer bank for the synchronous condenser was made up of seven 10,000-kva. 66Y/13.44D-kv. transformers which were available from an abandoned 66-kv. substation. Kelman oil circuit breakers are used for starting and running service.

The control house is a fully-enclosed air-conditioned concrete structure housing the control room and storage battery. Indirect lighting and light gray colored switchboard panels are the features of the control room. The switchboad is built of tempered hardboard (five ¼-in. ply) painted gray on the exposed front side, and white on the back side. Westinghouse rectangular-case instruments are used on the switchboard. Items of interest include potential indicators on four 66-kv. lines connected across the ground end insulator of the string of insulators on the dead-end structure, and an electronic voltage regulator on the battery charging motor-generator set.

Caldwell Sub

Unit is major part of Idaho's transmission additions

By B. C. RUSSELL
Idaho Power Co.

Idaho Power Co.'s electrical transmission system extends from east to west across the greater part of southern Idaho. About midway in this 400-mi. stretch of transmission network is the Hagerman Valley, where five principal hydro-electric power plants of the Company are situated on Snake River and tributary streams. The large, highly-productive irrigated tracts dependent upon these streams for water supply are separated from each other by vast stretches of arid lands, and many miles of transmission lines are required to deliver electrical energy from remote power plants over desert wastes to serve the larger communities and rural and urban population.

As early as 1920 it became evident that increased transmission facilities were necessary to deliver electrical energy from the Hagerman Valley to the western portion of the transmission system. In 1921 a 138-kv. transmission line was constructed from the Thousand Springs power plant in the Hagerman Valley west to Caldwell in the Boise

Valley. This line was 115 mi. long, and while it was constructed for 138-kv. operation was started at 69-kv. The period of depression postponed cutting this line over to its full voltage until the summer of 1938. In the meantime the growth in load had been partially taken care of by increased plant capacities and other minor improvements.

In 1937 the 18,000-kv. Upper Salmon hydro plant in the Hagerman Valley was completed and connected into the system with a 138-kv. line running east to Shoshone Falls. When it became apparent in 1938 that more capacity would be required in the west end of the system it was decided to raise the operating voltage of the Thousand Springs—Caldwell line to 138-kv. and terminate that east end of the new Upper Salmon station rather than at Thousand Springs. Since at the time Upper Salmon was built, no 138-kv. line breaker was provided, it was necessary to install two new breakers.

These changes in effect add the western end of a 138-kv. trunk line to the former network of 46- and 69-kv. lines, connecting to them at Shoshone Falls and at Caldwell.

Since the lines west of Caldwell are all 69-kv., a new 138/69-kv. substation was built to interconnect to this system. Two three-phase transformers were provided, each of which has a rating of 10,000 kva. air cooled and 20,000 kva. continuously, with forced oil circulation through water heat exchangers.

One 5,000-kva. shunt reactor was provided for each of the two transformers to operate off the 12.5-kv. tertiary winding.

Five new 69-kv. breakers were provided for the five radiating lines and a sixth serves as a combination transformer and 138-kv. line switch. All six breakers are built for high-speed reclosings, although only the one which serves as the Upper Salmon line breaker is now connected for such service. The five feeder breakers are equipped with delayed time reclosers and the necessary equipment to lock the breaker out if the line is energized from the opposite end and out of phase.

The main and by-pass busses are supported on pedestal insulators on 4-in. pipe posts, structural steel being used only for the line dead-end towers, for the gang-operated disconnecting switch structures, and the transformer lead supports.

The 69-kv. bus is protected by a ground differential relay and the transformers are equipped with phase-to-phase differential relays. Since no 138-kv. transformer or line switch was provided, use was made of the carrier equipment to trip the 138-kv. switch at Upper Salmon in cases of transformer fault. This is accomplished by a supervisory-control relay coding device, action of which is initiated by the transformer differential relays. At the Upper Salmon end of the line the coded signal from the carrier receiver operates similar supervisory control equipment which in turn operates a hand reset relay, thus tripping the line breaker and keeping its high-speed reclosing equipment from functioning.

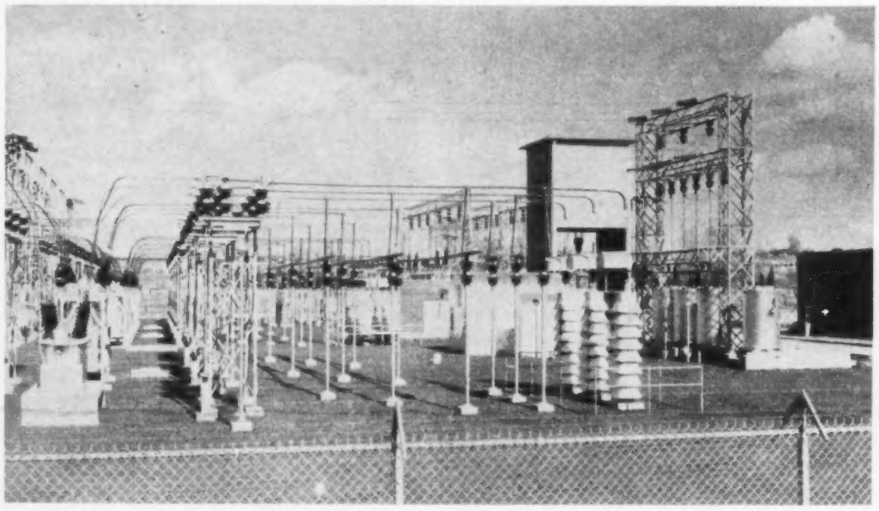
The old substation at Caldwell was fed from both the 69- and 46-kv. lines and served, in addition, to transfer some power from one network to the other. The local distribution system was fed from the 2,300-volt tertiary of the tie transformer, as was a 3,000-kva. synchronous condenser. As the site of the old substation was inadequate, it was decided to eventually move the condenser and the transformers to the new location.

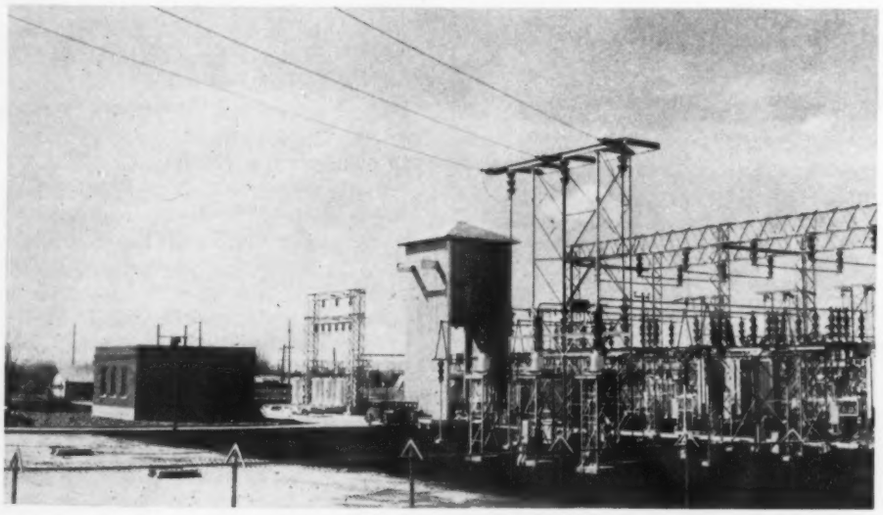
When the new substation was planned, sufficient room was left to add this equipment and provide a 46-kv. operating and by-pass bus and two bays to accommodate the two 46-kv. feeders.

This move was made in the summer of 1939, at which time a 12.5-kv. switching structure sufficient to accommodate four feeders, each with step-type regulators, two 1,000-kva. grounding transformers and the necessary by-pass bus so that the equipment on any feeder may be removed from service. This 12.5-kv. load is fed from the tertiary windings of the main power transformers.

The 46-kv. bus added with the last addition is insulated for 69-kv., and the next step will probably be to change the two remaining 46-kv. feeders to 69-kv.

Idaho Power's Caldwell substation, 138/69 kv. Equipment includes two 3-phase transformers of 10,000 kva. each, when only air cooled, a 5,000-kva. shunt reactor, 69-kv. breakers for five outgoing lines and a sixth serving both as transformer and 138-kv. line switch





Meter Tests

PCEA paper covering progress on standardizing tests and reports in California abstracted

By W. H. TALBOTT
San Diego Consolidated Gas & Electric Co.

This subject, while dealing with single-phase meters, includes a certain number of large size meters which come within the schedules now in effect in all utility companies of California. It is agreed by all concerned that a schedule of periodic tests for power and the larger size single-phase meters is necessary, and such schedules have been maintained for a number of years. The consensus of opinion is that some definite test period of all watt-hour meters should be adopted as a standard for the State of California. All companies operating in the State already have schedules, followed either as regular routine or as tentative and experimental periods. Records are being kept, which we hope, will in the near future furnish information for the adoption of a standard.

The California Railroad Commission has been making a survey covering the utilities within the State and has collected data which will be of great assistance in arriving at the proper periods for making tests. It is the desire of the utilities to give all assistance possible in this work.

San Diego Gas & Electric Company in 1938 adopted a plan of testing all meters which at that time had not been tested within the preceding six years. This includes meters that have not been tested for as long as 18 years. Results of these tests are very interesting and show that a meter when properly adjusted on installation will run for a number of years with very little change in its accuracy. We have, for the last three months, kept a record of tests by years in which the meters were last tested. This disclosed that meters purchased in the years 1925 and 1926 had a much higher percentage of accuracy than those purchased prior to these dates and in the years from 1927 to 1933. The results of this record which included meters which had not previously been tested for from 7 to 18 years, compare favorably with those of meters tested within considerably shorter periods.

After testing 28,462 old meters of all types and sizes in 1939, the company made refunds on 1,293 fast meters amounting to $898.55. 25.351, or 89% of the total, were within commercial limits of 2% plus or minus, and the average accuracy was 99.1%. Very few financial adjustments are made where slow meters are involved. We collect only on non-recording meters of our larger customers.

Labor and transportation costs for house-to-house routine testing of single-phase meters of 25 amp. and smaller were found to amount to 73 cents per meter.

The following are summaries of reports of tests from three other California companies. The first of these appears in Tables I and II.

Periodic tests of electric meters are made by Company B as follows:

1. Self-contained a. c. meters of less than 25 amp. are not tested upon fixed schedules. However, tests are carried on over the system in various areas in order to assure that such meters are maintaining their accuracy.

2. Self-contained a. c. meters larger than 25 amp. are tested annually.

3. Meters installed with instrument transformers are inspected annually.

4. Indicating type meters, demand, are inspected and tested annually.

5. Graphic type demand meters are inspected monthly and tested annually.

6. Direct-current meters are tested at intervals of 1 to 18 months, depending upon the installation.

Company C averages about 14,000 meter tests each year and finds the average accuracy on meters within 2% plus or minus to be fairly uniform when testing routine is maintained, i. e., 89.9% for single-phase and 97.4% for 3-phase. On its power meters it has a 12-months' period, and this is more than justified as it finds a large number of them, particularly the 460-volt agricultural meters to have damaged potential and current coils. Its testing is based on past experience, and work that cannot be justified by economies effected is dropped from routine.

In territory where electrical storms are frequent, we believe that shorter test periods are necessary than are required elsewhere.

Table I—Single-Phase Meters—Field Tests by Company A

Year	Period Years	Total Tests	Within Commercial Limits (+ or − 2%) Number	% of Total
1933	10.5	65,028	56,445	86.8
1934	8.1	138,321	117,719	85.1
1935	5.9	153,060	139,742	91.3
1936	5.3	116,687	107,370	92.0
1937	4.9	77,468	72,559	93.7
1938	4.6	89,982	85,352	94.9
1939	4.7	88,570	84,620	95.5

Light load test data is not included in these figures.
Of the total number of tests shown in the above data, they can be divided as follows:
Routine tests 93.9%
Installation test 7%
Complaint tests 5.4%
The "Period-Years" is average for the routine tests.

Table II—Polyphase Meters—Field Tests by Company A

Year	Total Tests	Meters Within Commercial Limits (+ or −2%) Number	% of Total
1933	11,960	10,025	83.8
1934	12,969	11,043	85.1
1935	14,531	12,575	86.5
1936	13,391	11,893	88.8
1937	14,797	13,170	89.0
1938	14,151	12,638	89.3
1939	17,378	15,545	89.5

Of the total number of tests shown in the above data, they can be divided as follows:
Routine tests 68.4%
Installation tests 24.0%
Complaint tests 7.6%
The above tabulated data on polyphase meter tests includes poyphase demand meters, and all polyphase watthour meters regardless of size. The demand meters and large capacity polyphase meters are on a yearly routine schedule. The self-contained polyphase meters are supposed to be on a two year schedule but in some cases this has been extended to 2½ years. The average period between tests for all polyphase meters would be very close to 2 years.

ABC's of Relays

Part 3—Development of differential protection

By E. B. KIPP
Westinghouse E & M Co., Los Angeles

SINCE loads on large generators, transformers, and motors are ordinarily under direct supervision of an operator, modern relaying practice requires that the protective relays operate only in case of internal failures in the equipment. These faults usually take the form of short-circuited turns, phase-to-phase short-circuits, grounds and open-circuits. The magnitude of the actual damage to the equipment depends upon the type of the fault and the length of time the fault current flows. It is, therefore, essential that the protective relays be both sensitive and fast in operation to prevent serious damage resulting from prolonged burning of insulation and laminations.

Many protective schemes against internal faults have been suggested, but the one most commonly used is based upon balancing the current entering the apparatus against the current leaving it. This is shown schematically in Fig. 1. As long as the secondary current in the two current transformers are equal, no current will flow through the relay. Any leakage to ground or to the other phases will, however, result in an unbalance. The unbalanced current must flow through the relay, and, if it is

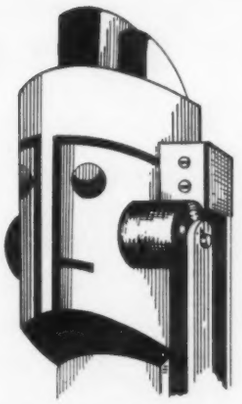
above the minimum pick-up value, the trip circuit contacts will close. Since an internal fault in a large piece of equipment is of major concern, the differential relays on a large generator, for example, are usually connected to trip the main circuit-breaker and the field-breaker, shut down the prime mover, sound an alarm and, in some cases, liberate carbon dioxide gas to extinguish any fires which may have started in the generator winding.

Theoretically, a sensitive over-current relay of the induction-disc type would be satisfactory for this application, since unbalance (operating) current should flow only during an internal fault. However, current transformers rarely have exactly similar ratio characteristics due to minor variations in manufacture or to unequal secondary loadings. Thus, a heavy "through-fault" (current flowing through the apparatus to an external fault) might unbalance the secondary circuit sufficiently to operate the relay unless it is set on a high-ampere tap or on a long time-setting. This results in decreased sensitivity and reduced protection in case of actual internal faults.

To overcome the inadequacies of the simple over-current relay when used in the differential scheme, the ratio-differential relay (shown schematically in Fig. 2) was developed. Mechanically, it is quite similar to other induction-disc relays, for it has the familiar disc and contact assembly, the restraining spring, damping magnets and electromagnet. The electromagnet is different in that it has two inter-connected current windings, one of which is a restraining winding (which tries to prevent operation) and the other an operating winding. The operating winding carries the differential (unbalance) current while the restraining winding carries the load current. The current required to operate the relay thus increases in proportion to the load instead of remaining constant for all load conditions. Hence, the name "percentage" or "ratio-differential." During heavy through faults the restraining winding generates a strong torque tending to hold the relay contacts open and thus prevents false tripping.

When used for rotating machine protection, the relay is usually made with taps in the operating winding so that it may be set to operate on an unbalance in current equal to 10 per cent or more of the smaller secondary current.

Transformer differential relays are usually designed to operate on a fixed percentage differential of either 25% or 50% and have taps to compensate for differences in primary and secondary current-transformer ratios, up to 2 to 1.



The decreased sensitivity is desirable because the relay might otherwise operate on the magnetizing current inrush whenever the transformer is placed in service.

While insulation failures on station busses are of remarkably rare occurrence, when troubles do develop, they often result in costly outages.

Differential protection can also be applied to busses by inserting current

Fig. 1—Current balancing, shematic

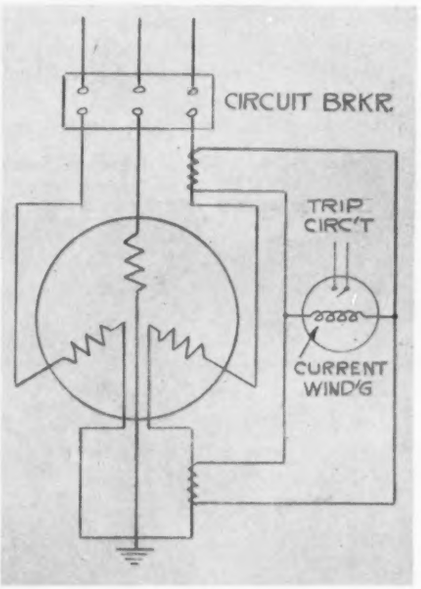
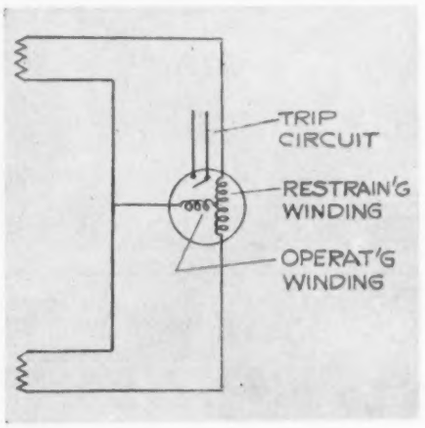


Fig. 2—Ratio-differential principle



transformers of the same ratios in the leads of all circuits entering and leaving the bus structure, so that the total incoming current can be compared with the total out-going current. Under normal conditions, the current entering the bus will equal the current leaving over the outgoing circuits, and the operating current through the relay will be zero. When a bus-fault occurs, the incoming current will no longer be balanced by the outgoing current since some of the current will leave the bus at the point of the fault.

The ratio-differential relay used for protecting multi-circuit busses is a more complicated unit in that it has several elements all operating a common moving element. However, the theory of operation remains substantially the same as for the simple differential relay.

The differential scheme of protection is often applied to two or more parallel (similar) transmission lines connecting two stations or points in a system. Under normal conditions, each line will carry approximately the same current and an unbalance means that the line carrying the greater current is in trouble.

The selective-differential current relay widely used for this application is fundamentally an induction-disc overload relay with two separate current windings, each of which is connected to the corresponding phases of the two balanced lines that are to be protected. The two windings are electrically opposed and under normal conditions of balanced line load, the resulting torque on the relay disc is zero. Normally the moving contact assembly is held in a mid-position between two adjustable stationary contacts by the action of two opposed control springs. Under unbalanced conditions, the disc will rotate in one direction for excess current in one line and in the other direction for excess current in the other line.

When a fault occurs in either line the current in that line becomes greater and the resulting unbalance causes the relay to trip out the circuit-breaker on the faulty line.

Operating current and time settings are made by adjusting (1) the number of effective turns in the current coils and (2) the contact travel, as in the over-current relay.

When one of a pair of lines is tripped out, the tripping current setting for the other line is automatically doubled due to the fact that half the operating coil in the relay no longer contributes torque. This is a desirable feature since the remaining line can assume the extra load and still be protected against short circuits

THE PACIFIC COAST ELECTRICAL ASSOCIATION

Industrial Data Sheet No. 4

SUBJECT.....ELECTRIC DRYING OVEN
TYPE OF WORK.....COSMETIC ROUGE DRYING
PLANT.....MAX FACTOR & CO., LOS ANGELES
SERVICE UTILITY.....LOS ANGELES BUREAU OF P&L

Prepared by Walter J. Collins
Los Angeles Bureau of Power & Light

Problem

To dry cosmetic rouge in such a manner that color would be uniform, that there would be no sealing of internal moisture due to over temperature, that during the 24-36-hr. drying period the oven could be left unattended without danger. (The safety element was of great importance because a fuel-fired oven had recently exploded, set fire to the buildings with the result that production could not be resumed for six weeks.)

Solution

The use of automatically controlled electric heat, providing the uniform temperature required for uniform color, prevention of the sealing of internal moisture, and the desired safety.

Equipment

A two-unit installation consisting of separate heating compartment and oven. This construction while not as efficient as that in which the heaters are mounted directly in the oven was used because it made possible utilization of the old oven which was not damaged in the fire and made possible getting the plant back into production at an earlier date.

The heating compartment, designed by Los Angeles Bureau engineers and built by Kreiger Bros., Sheet Metal shop. is of steel construction with 4-in. rock wool insulation, top, bottom and all sides. It is 5 ft. 6 in. high, 3 ft. wide 3 ft. deep and may be operated at temperatures up to 350° F. Heat is supplied by six General Electric ribbon-wound oven-type heating units each rated 3.8 kw. at 110 volts.

These heaters are arranged in delta connection, two in series per phase of the 240-volt 3-phase 60-cycle power supply. With this connection and voltage the bank delivers heat at the rate of 27 kw. Should more heat be desired heater groupings can readily be rearranged for a Y connection, giving an increase of approximately 1/3. Automatic temperature control is provided by a G-E CR-2992 thermostat with bulb in oven.

Switching of the heaters is through a G-E contactor panel. A second CR-2992 thermostat with bulb in heating compartment provides over-temperature protection in case circulation should stop. The oven unit is 10 ft. long, six ft. high and 3 ft. deep, originally heated by a gas furnace mounted alongside it.

Heated air is forced from the heating compartment into the two sections of the oven by means of a blower and duct system arranged for re-circulation. To provide uniform temperature throughout the oven the heated air enters each section through a manifold having three openings at each of the 20 tray levels. The air leaves the oven on its return trip to the heating compartment through openings in the top of the oven, one per section. Provision is made for exhausting some of the air leaving the oven to the atmosphere and admitting make-up near the bottom of the heating compartment. About 90% of the air is re-circulated.

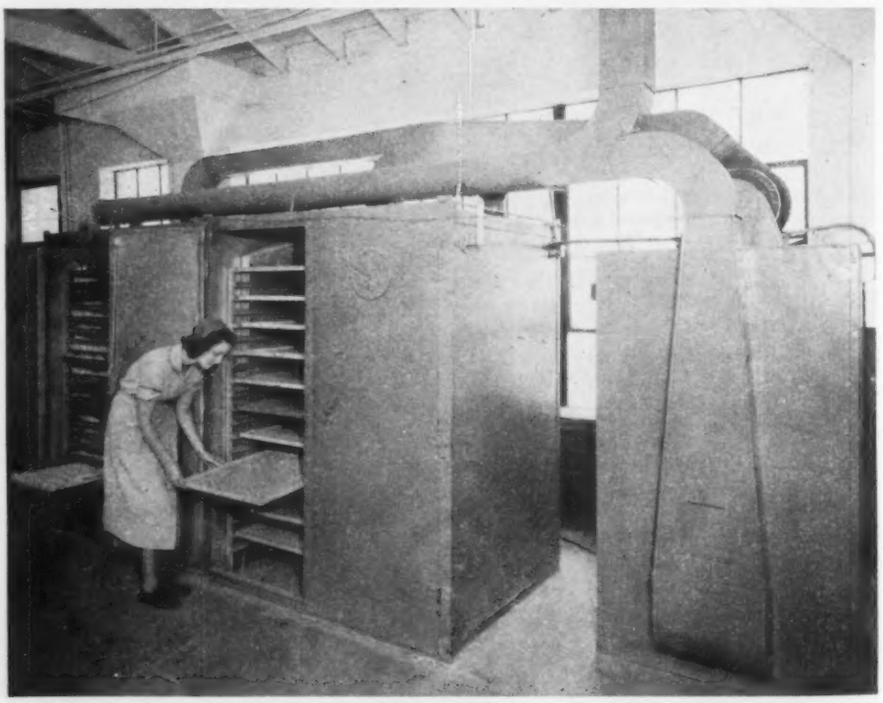
Operation

The oven is pre-heated to the normal temperature of 225° F. and charged with trays of rouge. Drying continues day and night. There are no attendants.

Realized Advantages

(1) Improved products due to close temperature control; (2) uniform color throughout each batch; (3) spoilage eliminated; (4) safety; An installation that can be safely left in operation during the night when the plant is otherwise shut down; (5) better working conditions; (6) less labor, no attendants required.

View of the oven installation for rouge drying at the Max Factor & Co. cosmetic plant, served by the Los Angeles Bureau of Power & Light. The plant is at 1666 N. Highland Ave., Los Angeles



Equipment Installed

6—3.8-kw. 110-volt G-E oven-type heaters	Lot	$88.50
2—CR 2992—thermostats	Lot	24.00
1—G-E contactor panel 70-amp. 220-volt 3-phase	Lot	43.00
Misc. bus bar supports, through wall terminals and bus bar		20.00
Total		$175.50

NORTHWEST ELECTRIC LIGHT & POWER ASSOCIATION

Utilization Data Sheet No. 33

SUBJECT.....PLASTIC SYRUP HEATING
CUSTOMER.....COLOTYLE CORP., SEATTLE
TYPE OF BUSINESS.....PLASTIC COATING
SIZE OF BUSINESS.....45 EMPLOYEES
SERVICE COMPANY.....PUGET SOUND POWER & LIGHT

Prepared by H. Van Wyk
For the Industrial Heating Section

Pressure Tank

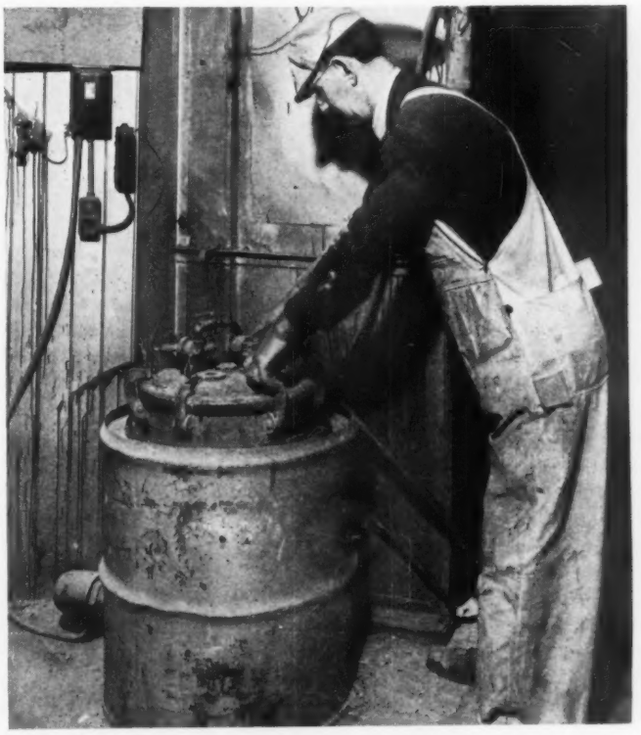
The unit consists of an outer container, within which the pressure tank for heating the plastic syrup is immersed in water. The container is an ordinary 30-gal. paint drum. The heating element is introduced into the container near the bottom and through the side by means of a 2-inch pipe-thread opening.

The immersion heater brings the water up to the required temperature, which is controlled by a thermostat. The heated water transmits its heat to the pressure tank. After the syrup is brought up to temperature, it is conveyed through a hose connection (as shown in the picture) to coating guns and is applied to the product.

The picture shows a workman fastening the clamps on the pressure tank, after having refilled it. The temperature differential is 8° F., which is close enough for this operation. Operating at 200° F., the tank uses 200 kw.-hr. per month. For further data, refer to Colotyle Corp.

Advantages

Advantages with reference to this process include: (1) denser finished product; (2) quicker penetration; (3) time saved; (4) better product; (5) lack of volatile shrink; and (6) control of subsequent expansion and contraction. Electric heating here has the merit of yielding: (1) a fire-proof process; (2) a process subject to accurate temperature control; (3) reduced labor cost; (4) automatic operation; and (5) low maintenance cost.



Temper Dip Tank

In this process, prestwood moldings are dipped into plastic syrup. The operation takes place in a tank 6 ft. 6 in. long by 1 ft. 2 in. wide by 3 ft. high. The trays for holding the moldings are placed upon a rack which is lowered or raised hydraulically as shown in the picture. There are nine trays, each of which will hold 18 strips 6 ft. long by 5/16 in. thick by 4 in. wide. The tank contains 100 gal. of plastic syrup, which is drained out upon completion of the processing.

It was found that by heating the plastic syrup, a better penetration was effected and a better product thereby produced. In order to provide this heating and maintain a low density of watts per square inch of heating surface, the BLS immersion heater was used. This was thermostatically controlled, and to prevent heat loss the tank was insulated with 2 in. of rock wool. The unit operates at 180° F.. consuming 65 kw.-hr. per month.

Advantages

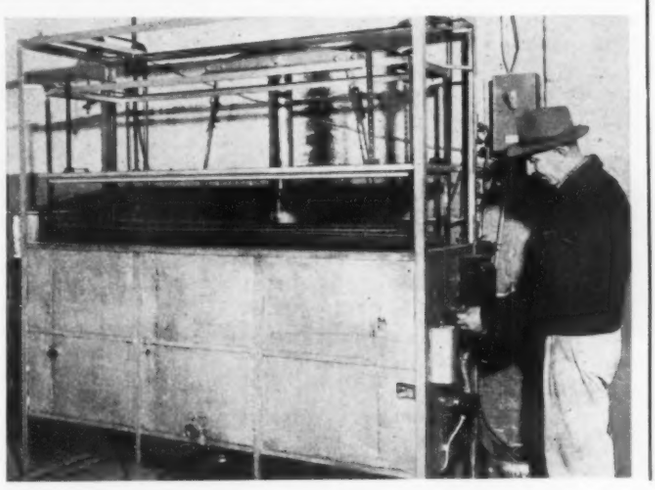
Heating produced: (1) better penetration; (2) faster production; (3) fewer rejections. Use of electric heat, as compared with other heat sources, yields the advantages as listed for the pressure tank.

Equipment Installed

(New Installation)

	Rating (kw.)	Equipment Cost	Installation Cost
2-BLs-140-230-volt, 4-kw., Chromalox immersion heaters @ $18.40	8	$36.80	
1-A.R. 30, style 9, Chromalox thermostat		12.50	
1-K220, 20-amp., 440-volt contactor		10.45	
Total	8	$59.75	$45.00

NOTE: Data above are identical for (i.e. they apply to either one of) the two equipments described herewith.



IAEI in the Northwest

Largest delegation ever registered for Northwestern section meeting rally for full four-day program at Great Falls, Montana

"LOOKING at the Code in the dark, or at least by twilight" (since the 1940 edition of the N.E.C. was not available in printed form for the meeting) may be said to have characterized the Code discussions at the 14th annual meeting of the Northwestern Section, IAEI at Great Falls, Mont., Sept. 3-6.

But this did not dampen the enthusiasm of the 321 registered delegates, the largest ever to grace an electrical inspectors' meeting in the Northwest. It served only to emphasize some very instructive and inspirational discussions of collateral subjects in the program while various progress reports from Article committees of the Section, based on the generally known provisions of these Articles in the new Code, laid the foundation for the work of these committees in the future.

In addition, the program of trips and entertainment, rather more elaborate than usual, filled all possible gaps in the four-day program. On the first afternoon, the delegates were taken on a tour of inspection of the zinc and copper reduction plants of the Anaconda Copper Mining Co. and the wire mill of the Anaconda Wire & Cable Co. in Great Falls. Entertainment features reached a climax in a picnic supper for over 700 delegates, friends and guests of the convention at the John D. Ryan plant of The Montana Power Co. at the "Great Falls" of the Missouri, 18 miles east of the city, topped off by a pageant in which a symphony orchestra and chorus of 50 voices participated. During this affair K. W. Adkins, International President, was inducted into the Blackfeet tribe by a group of a dozen old-time tribesmen and women. These and other features, including dinner dance, a general luncheon were handled by C. T. Booker, local division manager of The Montana Power Co., Great Falls, and were sustained by substantial support from that company, from the Anaconda interests and from all branches of the electrical industry in Montana, as well as by the largest list of exhibitors, 36, ever assembled at one of these conventions. These exhibits, tastefully arranged with decorative effects, dominated the lobby and the meeting room in the Hotel Rainbow. L. M. Burdick, General Electric Supply Corp., Butte, had charge of this feature. H. E. Chambliss, The Montana Power Co., Great Falls, was general chairman of the convention and was assisted by a number of sub-committee men from that company and from among the company's electrical industry colleagues in that territory.

High-light of the program was a brilliant lecture on present trends in the research laboratories of major U. S. industries by S. J. Rosch, manager of development and research for Anaconda Wire & Cable Co. Mr. Rosch unfolded an amazing story of the strides being made in the field of chemical engineering and in the production of synthetics and plastics, both in his own laboratories and in those of other industries. His talk had particular reference to the development of new insulating materials, and during it, he explained the scientific background for the new wire tables in the Code giving permissible carrying capacities within limited temperature rises. He showed how the grouping of conductors in one conduit affects their carrying capacities by affecting their heat radiating qualities. He also explained the development of the design and construction of large cables to reduce their a.c. resistance.

An illuminating analysis of the make-up of the electrical industry, by J. C. Ryan, vice president, The Montana Power Co., brought out clearly the important place occupied in the picture by the inspection fraternity, and paid particular tribute to the part played by skilled labor. Organized labor was prominently represented, and a message of greetings and cooperation was offered M. H. Hedges, national representative of the IBEW, Washington, D.C., and E. J. Brown, president of that organization, New York.

M. M. Brandon, Underwriters' Laboratories, New York City, gave a detailed account of how and why the Labratories listed approved appliances and equipment, explaining the workings of the label service and asking for recommendations from the field on any phase of the work that might be improved from the inspector's standpoint. An interesting film on the manufacture of

Blaine Grey (left), of Salt Lake City, retiring president of the Northwestern section, IAEI, congratulates the new incoming president, I. B. Sturges, of Portland, and wishes him good luck as the four day session of the organization's 14th annual meeting draws to a close

porcelain products was presented by the Illinois Electric Porcelain Co., the Knox Porcelain Corp. and the Porcelain Products, Inc., with a running explanatory comment by E. G. Romeiser representing these manufacturers.

Analyses of certain Articles in the new Code were ably presented by Victor H. Tousley, International Secretary, who explained the new tables on demand factor in Article 220 for figuring meter sizes. Article 250 on grounding was discussed by L. F. Adams General Electric Co., Schenectady, while Howard H. Weber, U. S. Rubber Products Co., New York City, took up Article 300 on wiring methods.

L. W. Going, chief electrical inspector, Portland, acting as a member of a special committee of the International Association to study the possibility of having in the Code special requirements for wiring in the fire zones of cities, offered a recommendation for the inclusion of a new Article to be numbered 310, covering wiring methods required or permitted.

Certain Article committees of the Northwestern Section introduced progress reports based on the new 1940 Code. These were debated and, in some cases, not entirely agreed with. All were accepted as progress reports and referred back to the committees for continued study and for bringing in final recommendations on recommended Code changes at the 1941 meeting. Committee chairmen introducing these reports were L. W. Going on Article 210; S. B. Clark, Northwestern Electric Co., Portland, on Articles 230 and 450; M. T. Crawford, Puget Sound Power & Light Co., Seattle, on Article 240; H. H. Schoolfield, Pacific Power & Light Co., Portland, on Article 334; A. J. B. Dixon, Puget Sound Power & Light Co., on Article 460; Chris Klawa, electrical inspector, Portland, on Article 600; I. B. Sturges, electrical inspector, Portland, on Articles 660 and 810; E. B. Morrison, Oregon Insurance Rating Bureau, Portland, on Article 700; and H. S. Jenkins, electrical inspector, Bellingham, on Article 800.

Closely associated with the Code and its administration and present in many ordinances and some state laws is the provision for sales control which has been in effect in the city of Portland for 18 years. I. B. Sturges of the Portland inspection staff, outlined the history of this legislation and enforcement showing how enforcement was secured largely by education of the dealers. W. R. Volheye, chief electrical inspector for the state of Oregon, whose inspection law also contains sales control provisions, stated that educational methods were being used by his staff in enforcement, and that these methods were generally meeting with success.

C. T. Booker (at right), division manager, The Montana Power Co., Great Falls, and entertainment impresario at the convention, introduces one of his main features, a group of full-blooded Blackfeet, who presented Indian dances and ceremonies at an enjoyable evening picnic

Recent amendments to inspection laws in the Association territory were reported by F. H. Murphy, Portland General Electric Co., Portland, chairman of the Section's Legislative Committee.

Two Code breakfasts enlivened the early morning proceedings of the convention. The first, presided over by W. L. Gaffney, chief electrical inspector, Tacoma, took up the subject of overheating of switches and specifications for recessed lighting fixtures. The second Code breakfast, at which E. G. S. Pryor, Underwriters' Laboratories, Seattle, presided, took its hair down on the subject of armored cable troubles. Some jurisdictions in the territory prohibit the use of this wiring method. N. L. Bost, National Electric Products Corp., Seattle, and others brought out that practically all the trouble with this material is from installation and not from any inherent structural weaknesses.

Dedicated at convention was radio-controlled scoreboard at Memorial Stadium, Great Falls, built by the Morony plant, Montana Power Co.

The "State of the Nation" reports on the International Association and Northwestern Section were ably handled by K. W. Adkins, president, IAEI, St. Louis, and Blaine Grey, chief electrical inspector, Salt Lake City, president of Northwestern Section. Fred D. Weber, the perennial secretary-treasurer, showed the Association to be in healthy financial condition and to have increased its membership by 120 during the past year. Chapter reports were heard from Chester M. Kirsop, electrical inspector, Olympia, for Puget Sound, and J. Hyde Stayner, Utah Power & Light Co., for Utah. A charter was presented for a new Montana Chapter, to Thos. Lloyd, Butte, by International President Adkins.

At the last session, I. B. Sturges of Portland was elected president while W. L. Gaffney of Tacoma was elevated from second vice president to first vice president, and W. R. Volheye, chief electrical inspector for Oregon, was elected second vice president. Fred D. Weber was re-elected secretary-treasurer, as well as the Northwestern Section's representative on the Executive Council.

The convention closed with a general luncheon at which golf prizes were awarded. A. E. Bacon, Edwards & Co., Denver, carried off the Northwestern Section's perennial cup, which has been in competition for 11 years. The Harry B. Kirkland cup, for active inspectors only was won by Fred D. Weber. Unusual enthusiasm was evidenced by those present toward the general excellence of the convention, with particular commendation of The Montana Power Co. and the Anaconda interests acting as joint hosts.

RMEL Convention in the Southwest

Over 300 electrical men converge on Albuquerque to discuss the problems and challenges in their industry

CHALLENGES, not threats, all of which can be met and overcome by industry unity, were presented to the 300 odd utility people, contractors, wholesalers, retailers and manufacturers' representatives who attended the annual Rocky Mountain Electrical League convention at Albuquerque, N. M., Sept. 9-11. Street and highway lighting, adequate wiring, engineering, public relations, taxation, fluorescent lighting and cooperation in the national defense program offered challenges and opportunities speakers told the group.

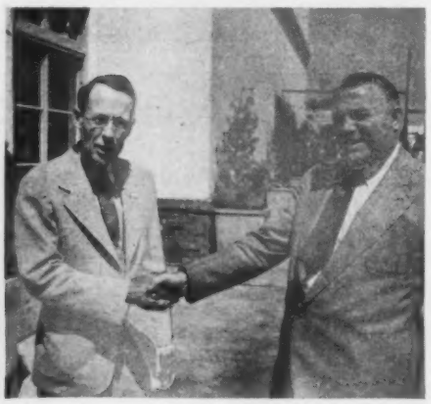
Plans were announced for a concerted 5-year drive to develop street and highway lighting in Colorado, Wyoming and New Mexico. This field, according to Gaylord E. Buck, Public Service Co. of Colorado, presents the big opportunity for the future, comparable to the Better Light-Better Sight and kitchen modernization programs. A dramatized presentation by the league's street and highway committee under the chairmanship of Murray Graff, General Electric Co, Denver, showed how surveys and recommendations had resulted in modernized lighting on many Denver streets. Arterial lighting employing fixtures using one 400-watt mercury vapor and two 100-watt incandescent lamps has become the standard, with sodium vapor lamps being used on viaducts and at dangerous intersections. A complete relighting program for Denver has been developed according to Dana Rowten, Public Service Co. of Colorado, which entails the zoning of streets into main and secondary business and heavy and light traffic arterials. Similar studies are being made for other communities.

During this presentation the theory and operation of the new street lighting evaluator were demonstrated by Kirk M. Reid, General Electric Co., Nela Park. One of these units has been purchased by the RMEL for use by member companies in making street lighting surveys and recommendations. Purposes of the program which was outlined are mainly humanitarian, according to Graff, who pointed to the loss of life through night accidents. Incidental benefits, he declared, would be additional business for all branches of the industry, as well as development of a market for the large blocks of power that will be made available from the Federal hydroelectric projects in the Rockies.

Another phase of illumination to receive major attention on the convention program was fluorescent lighting. Principles of fluorescent lamp operation were explained and demonstrated by C. F. Jensen, Westinghouse, St. Louis, who recommended that these light sources be thought of as a new device rather than as just a new lamp. W. B. McKechnie, also of Westinghouse, urged that fluorescent installations be sold on the basis of "Better Light-Better Sight" rather than on the basis of "savings." That increased attention to fixture designs for this new tubular light is essential was the opinion expressed by A. J. Walter, G-E Incandescent Lamp Dept., who added that fluorescent lighting was here to stay and that the electrical industry should guide its proper application. H. T. Rankin, Public Service Co. of Colorado, chairman of the RMEL lighting division, reported on two successful fluorescent lighting schools and warned against the "muscling in" on the fixture business of tinsmiths, plumbers and others.

That the electrical contractor can no more be expected to sell adequate wiring than the carpenter has sold good houses or the plumber sold passionate bathrooms was the declaration of Ralph E. Johnson, Sturgeon Electric Co., Denver, RMEL adequate wiring division chairman. He charged that the appliance manufacturer had as great a stake in adequate wiring promotion as anyone. For proof he cited the experience of an ironer salesman who had practically every sale of a 1,250 or 1,500-watt ironer "bounce" because of unsatisfactory operation due to inadequate wiring. T. M. Foulk, Public Service Co. of Colorado, outlined the successful technique employed in staging two demonstration homes in Denver that attracted over 6,000 visitors each. He also demonstrated a new wiring display board that

Arthur Prager (left), general convention chairman and general manager, Albuquerque Gas & Electric Co., won plaudits for the splendid hospitality extended to all who attended the convention. "Best wishes," says retiring RMEL president Henry E. Samson (center picture—left), Southwest Public Service Co., Roswell, N. M., to president-elect G. B. Buck. Don C. Germond (right picture), Mountain States Power division sales manager at Casper, Wyo., received RMEL award for outstanding accomplishment during 1940 in promoting dealer-utility cooperation



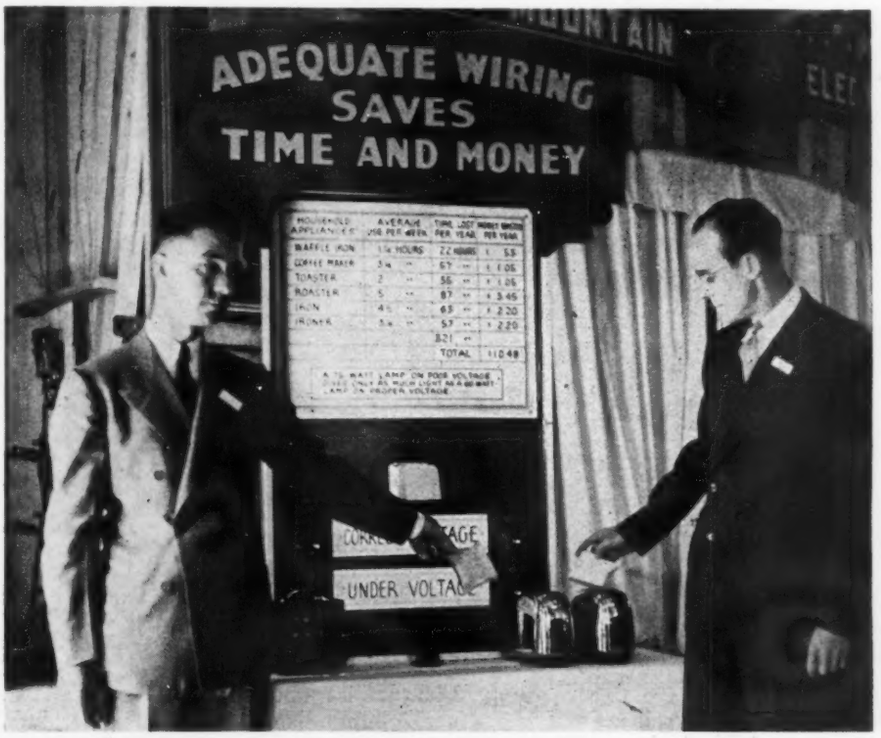
showed vividly the effect on lighting and appliance operation of normal and 10% below normal voltage. Lighting efficiency dropped 30%; an automatic toaster required twice as long and used two-thirds more energy to make a slice of toast. Too many people in the electrical industry are too complacent about the wiring problem, according to Johnson.

Two engineering presentations were sponsored by the League's engineering division under the chairmanship of L. M. Robertson, Public Service Co. of Colorado. Latest central station apparatus developments were described and illustrated by A. C. Monteith, engineering manager, central station section, Westinghouse. In generation he declared that the trend was toward higher temperatures and pressures, streamlining, hydrogen cooling and better thermal economies. Transmission lines today are virtually lightning proof, he said, due to the development of new protective equipment. He described the Fulchronograph, a device that records lightning surges, which has demonstrated that currents varying from 100 to 20,000 amp. can exist, that there can be long-duration surges of low currents and repeated strokes in short periods. While 287 kv. remains the highest operating voltage, he reported that the industry could produce 330-kv. equipment with present designs.

D. C. Prince, manager of the G-E commercial engineering department, Schenectady, asserted that extension of the work week from 36 to 45 hours, coupled with the application of modern research and engineering, can make possible the accomplishment of the defense program in America without lowering present-day standards of living. The country can work 25% more efficiently, he said, by applying the latest scientific developments, provided it does not let distractions interfere with the job to be done.

Other speakers covered a variety of pertinent subjects. Earl W. Hodges, Electrical Advisors, New York, emphasized that the base of the utility business has to be friendship and urged that more paid advertising be used to inform the people "not by speaking down but by speaking out of them." C. E. Greenwood, Edison Electric Institute, New York, made a plea for more flexible thinking by utilities in connection with their merchandising activities, declaring that "no company is ever completely out of the merchandising business." W. A. Keleher, attorney for the Albuquerque Gas & Electric Co., called attention to the encroachment of Federal legislation in fields hitherto considered solely as belonging to the states. D. C. McCreery, attorney for the Public Service Co. of Colorado, discussing taxation, pointed to the double-edged intepretations of "valuation" as applied to rate-making, return on capital and levies for taxes.

T. M. Foulk (left) Public Service Co. of Colorado, and Ralph E. Johnson, Sturgeon Electric Co., chairman of the RMEL Adequate Wiring Division, demonstrate the wiring board developed by them to show the public how insufficient wiring costs money



Two awards were made to league members at the annual banquet. Don C. Germond, Casper, Wyo., division sales manager, Mountain States Power Co. received the RMEL award for outstanding accomplishment during 1940 for his work in promoting dealer-utility cooperation in Wyoming. Ralph E. Johnson, chairman of the adequate wiring division received a special citation for the outstanding work of his group.

Entertainment features provided by Arthur Prager, general manager, Albuquerque Gas & Electric Co., were highly enjoyed. They included a golf tournament, a "smorgasbord" banquet followed by a fluorescent lighting show, and a barbeque and dance at the Albuquerque Country Club.

Officers elected for the coming year included G. B. Buck, Public Service Co. of Colorado, president, and Arthur Prager, W. D. Johnston, Mountain States Power Co., Casper, Luke Storey, Home Gas and Electric Co., Greeley, Colo., and Ross E. Adams, Hendrie & Bolthoff Co., Denver, vice-presidents. Re-elected were W. C. Sterne, Arvada Electric Co. Denver, treasurer, and George E. Lewis, secretary and managing director.

Agenda

AIEE—Utah section—L. A. Hawkins, G-E executive engineer, research laboratory, spoke at the first fall meeting on Sept. 20. On Oct. 8, A. C. Monteith, engineering manager, Westinghouse, was a special speaker.

Electrical League of Utah—On Sept. 11, in collaboration with local chapter of AIEE, league presented Samuel J. Rosch, Anaconda Wire & Cable, New York. Rosch's subject was "Present and Future of Trends in Wires and Cables."

IES — Southern California section — Met Sept. 10 for monthly meeting. Speakers were R. A. Crosby, Bureau of Power & Light, and W. Trent German, Southern California Edison Co. "Planning a Fluorescent Lighting Installation" was discussed. Chairman of the evening was Frank T. Anderson. Meeting night has been changed to first Tuesday evening of the month. This becomes effective with the October meeting. Dinners will continue to be at Eaton's Chicken House.

Electric Club of San Diego—Met Sept. 3 to hear Capt. Burritt S. Mills, industrial and research engineer, tell of experiences in "Paris, Immediately before and during World War II." Chairman of the day was Harvey Watt, Thearle Music Co.

San Diego County Bureau of Radio & Electrical Appliances — Ben Rogers, Firestone Service Stores, has been elected president; R. E. Harris, Standard Electric Corp., first vice-president; C. W. Kinmore, Kinmore Electric Co., Chula Vista, second vice-president; Sam L. Hall, Electric Supplies Distributing Co., treasurer; J. Clarke Chamberlain continues as secretary-manager, and has set Dec. 3-8 as period for annual Electrical Show.

NEWA

Pacific Division holds fall meeting in Victoria

Something of the leisurely and thorough character of the meeting place went into the program of the Pacific Division, National Electrical Wholesalers Assn., at its annual fall meeting, held at the Empress Hotel, Victoria, B. C., September 10-11. According to R. A. Balzari, secretary, there was less scheduled and as a result a better and more thorough discussion of all of the subjects at the various meetings. Attendance too was exceptionally good with about 80 present. Fred Todt, chairman, presided.

Two Westinghouse speakers occupied the Tuesday morning session. Frank Anderson, Pacific Coast engineer, Westinghouse Lamp Company, Los Angeles, gave an illustrated talk on fluorescent lighting. In it he traced the development, explained the construction and outlined the commercial applications and profit opportunities with this new light source.

Chas. Dostal, Pacific Coast general manager of Westinghouse Electric and Mfg. Co., San Francisco, concluded with an inspirational talk, "Our Industry," in which he set forth the interrelationship of various groups in the industry.

James Polhemus, president Portland General Electric Co., opened the Wednesday morning session with a frank and penetrating discussion of the social and economic effects of the Bonneville project upon the people and the industry of Oregon and Washington. He outlined in detail the basis upon which his company is proceeding to fit in with existing conditions so as to bring the greatest advantages to consumers and still protect the interests of the investors in the utility.

Thrilling and deeply moving was a powerful address given by Dr. Norwood, rector of St. Mathews Wesleyan Church, Vancouver, B. C. A native of Australia who had spent some years in England and Canada, he had just returned from a protracted visit to England and spoke with tolerance and understanding of the various contributing factors to the present war. "Britain Holds the Pass" was his talk in which he made vivid the sincerity of purpose of that country to protect the democratic principle of government with no thought of adding land or aggrandizing the Empire.

The customary golf tournament brought the copper cup to Marvin Jankelson, Incandescent Supply Co., San Francisco; the utilities cup to James Polhemus; the manufacturers' cup to T. H. Crosby, The Canadian Westinghouse Company and the Glenndening trophy to R. A. Balzari. The golf banquet had as guests prominent British Columbia Electric Railway executives and other prominent Canadians. National Carbon Co. was host at a cocktail party before the banquet.

Vancouver Electric Club

Activities of the Vancouver Electric Club during the current year will be under the direction of the new executive elected at the concluding meeting of the club last Spring. The new officers and directors have now formally taken over the affairs of the club and are outlining the program for the winter season. George Knowles, new president, is sales engineer with the Canadian Telephones and Supplies Ltd. at Vancouver.

Vice-president is B. W. Markham, Northern Electric Co. Ltd., who has served both as secretary and as director of the club for many years. R. A. Benson, Canada Wire and Cable Co. Ltd., is honorary secretary and F. Lightfoot, Northern Electric Co. Ltd., is honorary treasurer.

Directors of the club are: L. B. Stacey, district manager, Packard Electric Co.; E. E. Walker, sales manager, B.C. Electric Railway Co.; M. Davies, manager, Langley Mfg. Co. Ltd.; H. N. Walters, stores manager, B.C. Electric Railway Co.; J. M. Todd, B.C. Electric Railway Co.; F. J. Bartholomew, president, Electric Power Equipment Corp.; H. F. Meredith, district manager, Canadian National Carbon Co.; F. W. MacNeill, dept. manager, Canadian General Electric Co.; and A. T. Napier, superintendent, Neon Products Ltd.

New NECA Chapter

A new chapter of National Electrical Contractors Assn., to be known as the San Francisco Bay Chapter, was organized at a meeting Sept. 12, 1940. Clyde L. Chamblin was elected chairman and Tom Harris, secretary-treasurer. In organizing the chapter, Chamblin made clear that its purpose was not to duplicate in any way the activities or functions of the San Francisco Electrical Contractors' Assn., but merely to maintain a chapter organization of national members for liason between San Francisco association and the NECA on national affairs.

Last year the entire San Francisco association was included in the NECA, the association paying dues of the members and holding a charter in the name of the association.

PCEA

District meetings scheduled for October

A forthcoming series of PCEA district meetings has been disclosed by Vic Hartley, PCEA managing director. All sessions will be dinner meetings, starting at 6:30 p.m. Locations and local chairmen are as follows: Reno, Hotel Golden, H. A. Lemmon, manager, Sierra Pacific Power Co.; Sacramento, Elks Club, E. W. Florence, division manager, PG and E, Sacramento; Sonoma, Mission Inn, Clifford Bartlett, division manager, PG and E; San Francisco, Western Furniture Exchange, C. W. Goodwin, San Francisco manager, G-E Supply Corp.; San Jose, Sainte Claire Hotel, J. S. C. Ross, division sales manager, PG and E; Watsonville, Hotel Resetar, Frank Thomas, district manager, Coast Counties Gas & Electric Co.; Santa Barbara, Elks Club, E. B. Cummings, division manager, Southern California Edison Co.

Huntington Park, Masonic Hall, A. I. Whitehead, division manager, Southern California Edison Co.; Long Beach, Hilton Hotel, Robt. W. Abright, president local contractors, and C. H. Bogle, Elec. Appliances division of Long Beach Retail Merchants Assn., as vice-chairman; Riverside, Aurea Vista Club, H. Dewes, general manager, Nevada-California Electric Corp.; San Diego, Hotel San Diego, L. M. Klauber, vice-president in charge of operation, San Diego Gas & Electric Co.

Procedure of meetings will be the introduction of PCEA president Houston, who will preside at all the gatherings. There will be a talk by Dr. G. W. Allison, Modern Kitchen Bureau, and at first five meetings, Reno to San Francisco, Dr. F. P. Woellner, professor of education at UCLA, will give a closing inspirational address.

At the next four meetings, San Jose to Bakersfield, the inspirational speaker will be F. T. Letchfield, vice-president of the Wells Fargo Bank, San Francisco. At Santa Barbara, Dr. W. Ballantine Henley, formerly head of the coordination office at U.S.C., will speak, and at the concluding five meetings, Lloyd Wilson, public relations director, San Francisco YMCA will address the groups.

E. P. Smith, PG and E division manager at Fresno, J. G. Neal, Nevada-California Electric Corp., El Centro, J. H. Fagg, PG and E division manager, Chico, and Harold K. Fox, Edison division manager, Bakersfield, will also serve as chairmen. Place of meetings in these cities has not been announced.

Puget Power Has Farm Lab

A closeup of the farm electrification laboratory of Puget Sound Power & Light Co. at Puyallup, Wash. This complete, modern workshop is in charge of Charles Wildebour (right); Glen Cushing stands at the left

PUGET Sound Power & Light Co. is keeping a good weather eye out for the farmer. To further uses of electricity on the farm, the company maintains a farm electrification laboratory at Puyallup, Wash.

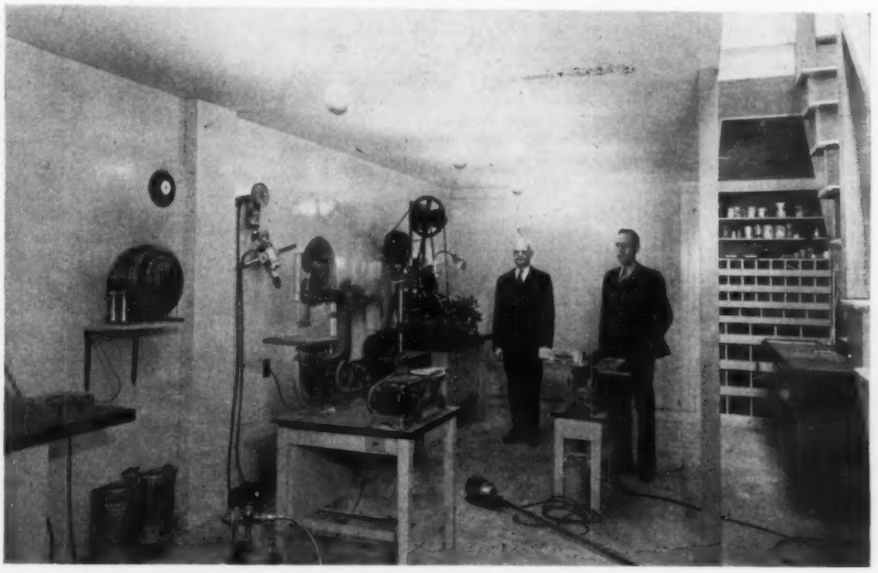
Two floors house this unique service station for rural technical problems. On the first floor (shown at right) is a screw-cutting lathe, a band saw, circular saw table, jointer, and two work benches, together with a very complete assortment of hand tools and general utility equipment. On the second floor is the office and drafting room, instrument cabinets and storage space.

Eight field men, located throughout the company's system, submit their technical problems to this laboratory for solution. These problems are always given first consideration. All additional available time is devoted to the origination and development of new and improved devices and methods for farm use. Among the developments made and already in service are: electric fan ventilated brooder, electric soil sterilizer, hen battery room air conditioning, poultry trough heating, bulb curing rooms, and an egg humidor.

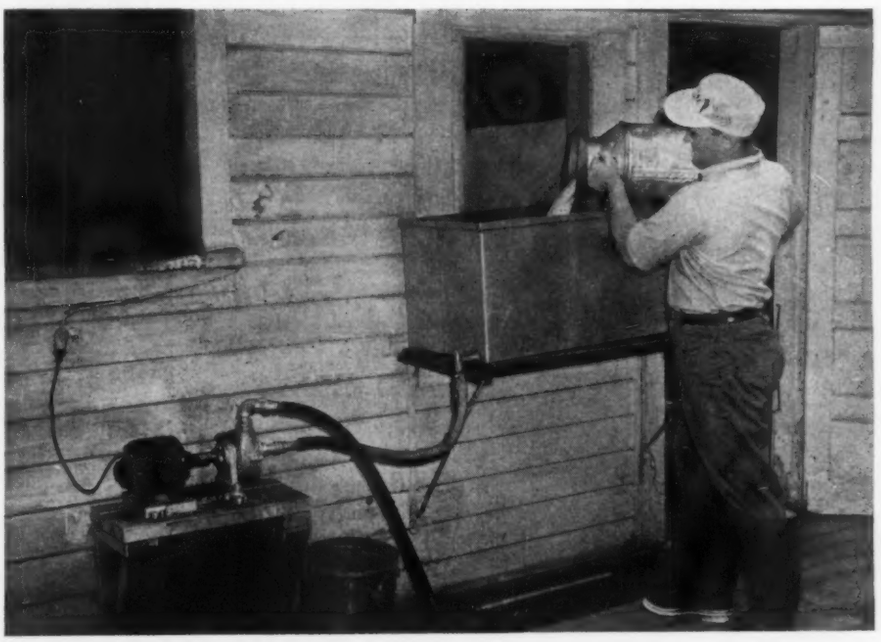
Other projects such as hay dryer, electric cultivator, and an electric hoe (see ELECTRICAL WEST, December, 1939), are in various stages of development to the point of assured success. Numerous other projects are in line for consideration as soon as time permits.

The laboratory is ideally located for the reason that Western Washington Experiment Station is also located near Puyallup. Some projects are carried on jointly with the Experiment Station and all developments are approved by it before recommending them to the farmers. The Experiment Station director and his staff of specialists (always ready and willing to assist) are of inestimable value on many occasions when information is needed about plants, soils, or livestock.

While the application of electricity on the farm is the major objective of the laboratory, projects need not necessarily be of a current-consuming nature to warrant attention. It is the policy of the company that effort should be put forth on any problem, the solution of which will contribute to the prosperity of the farmer and the consequent eventual development of the territory in which the company serves.



Milk via Electric Power to Hogs



ONE THOUSAND GALLONS of skim milk are carried by electric power to hogs for one penny on the Hollywood Retail Dairy in Oregon on the Columbia River Gorge. The farm is owned by J. A. Bucher, who uses his skim milk to feed out several pens of hogs, supplementing his farm income from the dairy herd. Ten years ago, Bucher claims, he used five gal. buckets to carry his skim milk. At that time he fed approximately 60 gal. of milk to 20 hogs daily, which required 6 trips to the hog barn. After using a truck for a while, he decided to make use of a 1/4 hp. motor and brine circulating pump which had recently been replaced by a more modern refrigerating system. Now Bucher can pump 50 gal. of milk in ten minutes. This milk is taken from the cream separator and poured into a large stainless steel tank, pumped through a pipe into 150 gal. barrels in the hog barn. Here it sours before it is mixed with mash to grow fancy pork

ELECTRICAL WEST

The All-Industry Magazine of Progress

Established 1887 and Incorporating the "Electrical Journal," "Journal of Electricity, Power & Gas" and "Journal of Electricity"

McGRAW-HILL COMPANY OF CALIFORNIA
68 Post Street, San Francisco

Contents Copyrighted

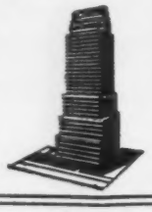
James H. McGraw, Chairman of the Board Howard Ehrlich, President
George C. Tenney, Vice-President and Editor
W. A. Cyr, Associate Editor
Wayne Snowden, Engineering Editor
G. William Gahagan, Assistant Editor
R. A. Balzari, Publishing Counselor
Roy N. Phelan, Secretary-Treasurer & Manager
Hans Hjorth, Typography

MEMBER AUDIT BUREAU OF CIRCULATIONS

ADVERTISING REPRESENTATIVES
Ralph H. Flynn, 330 W. 42nd St., New York
William B. Heaps, 520 N. Michigan Ave., Chicago
Roy N. Phelan, 68 Post St., San Francisco
Stephen H. Babcock, 2-144 General Motors Bldg., Detroit

EDITORIAL ADVISORY BOARD

UTILITIES: R. E. Fisher, Vice-President in Charge of Public Relations and Sales, Pacific Gas and Electric Company, San Francisco; J. A. Hale, Vice-President, Utah Power & Light Company, Salt Lake City; Glenn L. Jackson, Vice-President and Commercial Manager, The California Oregon Power Company, Medford; Frank McLaughlin, President, Puget Sound Power & Light Co., Seattle; L. T. Merwin, President, Northwestern Electric Company, Portland; W. C. Mullendore, Executive Vice-President, Southern California Edison Company, Ltd., Los Angeles . . . MANUFACTURERS: Vernon Brown, Vice-President, Square D Company, Los Angeles; C. A. Dostal, Pacific Coast Manager, Westinghouse Electric & Mfg. Co.; A. S. Moody, Northwest Manager, General Electric Company, Portland . . WHOLESALERS: J. I. Colwell, Northwest Manager, Graybar Electric Co., Inc., Seattle; N. W. Graham, Graham-Reynolds Electric Co., Los Angeles . . . CONTRACTORS: Lloyd Flatland, Globe Electric Works, San Francisco; S. G. Hepler, Arrow Electric Co., Seattle . . . DEALERS: H. H. Courtright, President, Valley Electrical Supply Company, Fresno; J. C. Chamberlain, Sec'y-Mgr., Bureau of Radio and Electrical Appliances, San Diego.



A Prayer

THERE should be on the lips of every man and woman in the private utility industry this fervent prayer between now and the November election: Oh Lord, give these United States of America a national administration that will be temperate and rational in its relations with business and industry. Remove from office, oh Lord, that group of self-perpetuating bureaucrats who foster and promote destructive competition between government and private enterprise to the end that investments made in good faith and in accordance with the law will be wiped out. Give us legislators and leaders who will forswear continuous and perverted political propaganda aimed at the destruction of private enterprise. Save us from further vilification by politicians whose purpose it is to cloak us with the stigma of criminal or anti-social activities when our sole aim has been to serve the public. Protect and preserve us from any more strong-arm political tactics that would force the communities we serve to accept government ownership with free gifts of tax-raised and tax-backed money. Help us to eliminate those government employees whose sole qualification for a policy-making position is violent hostility toward private enterprise. Give us an opportunity to go about our daily business without the constant threat of governmental interference. Do all these things so that we may devote all of our energies and skills to the task of better serving the public as respected individuals engaged in public service. Amen.

Conscription and You

MANY people in the electrical industry are wondering just how conscription is going to affect employers and employees in the different branches of the business. While it is unlikely that the first conscripts will be called before November 1, and at that time only 75,000, there is no time like the present for making plans for future eventualities.

As regards the utilities, the guiding principle in determining deferments from military training will be individual circumstances and not occupational groups. Decisions, at least in the first instance, will rest with draft boards. However the law does provide that the President, through the local draft boards, may defer the services of those who are necessary "to the maintenance of the national health, safety or interest," in other words, those vital to the national defense program. It is understood that the Army is preparing a list of industries and skills involved in the defense program and it can be assumed that careful consideration will be given to technical positions both in the electrical operating field and in the power supply and distribution-equipment manufacturing industries.

Among other branches of the industry, those most vitally affected are the appliance people from manufacturers to dealers. The conscription bill re-enacts the Soldiers and Sailors Civic Relief Act of 1918, with the addition that individuals having contractual relations for installment purchase and sale may cancel their contracts by mutual agreement. Moreover, a second bill is now before Congress which covers not only contracts, but such things as insurance, personal loans and notes, general debts and taxes. With the threat of conscription hanging over 16,500,000, there is a feeling that sales of such things as major appliances, which usually are purchased on the installment basis, will fall off. Dealers also may be hesitant to write installment contracts, when faced with the possibility of cancellation.

Two things should be borne in mind by the appliance trade: In the first place the odds of a man in the 21-36 year age bracket being drafted are only one in 35. Also the young married man is likely to be put on the deferred list. Thus any retailer would stand to lose virtually nothing if he advertised a guarantee to take back any appliance sold on an installment contract provided the purchaser was drafted.

None of the problems arising from the conscrip-

tion bill should seriously affect the industry provided they are appraised sanely. There is no reason for any hysteria.

Ought to Know Better

FOR proof of the truth of the adage that "a little knowledge is a dangerous thing" the PCEA Range and Water Heater Committee can offer the results of a survey just completed. The committee set out to sample electrical industry opinion and knowledge of the relative costs, speeds and merits of electric and gas cooking and water heating. What it discovered was a striking lack of up-to-date knowledge coupled with a tremendous amount of inexpert "expert" opinion.

Of the 5,000 plus electrical men and women in California who answered the committee's questionnaire 74 per cent believed that the operating cost of an electric range exceeded $3 monthly. The average retail selling price of an electric range (not installed) they guessed as $161; for a comparable gas range they estimated $128 as the sales price. Approximately half of those answering thought gas faster than electricity for cooking. One bright ray was that 4,041 reported that they preferred electricity to gas. Perhaps the general advantages they listed give the key to his preference—cleanliness, safety and coolness were desirable features attributed to electric cooking while economy, speed and ease of installation were advantages which they ascribed to gas. Opinions regarding water heating paralleled those for cooking. Estimates of operating cost were too high as were the comparative selling prices of electric and gas heaters. Moreover decidedly fewer people preferred electricity to gas for water heating.

As yet the committee has made no recommendation. Perhaps its members were too appalled by the survey findings to do more than report them. Certainly it must recognize that only a few people in the industry can qualify as salesmen for either electric cooking or water heating. What seems to be needed is an internal campaign to sell the industry itself on the costs and advantages of electric cooking and water heating and to clarify the mistaken ideas of electrical people themselves.

Civil Service?

EMPLOYEES of private utilities whose yearnings may have drifted toward tantalizing civil service and its mirage of security should take heed of what is happening in cold reality at Los Angeles Bureau of Power and Light. Civil service is little protection to the 200 employees dropped in the political purge now going on nor to those demoted and superseded.

Municipal ownership is also no security to dealers, wholesalers or manufacturers whose business opportunities depend materially on continuing policy from the utility, whatever that policy may be. A change of political administration brings with it a "new broom" of "righteousness" to sweep the old administration and all of its policies overboard. Even those policies evolved slowly and soundly and necessary to the entire industry are swept out by a new broom that does not know what is dirt and what isn't.

Both Seattle City Light under J. D. Ross, and Los Angeles Bureau of Power & Light under E. F. Scattergood were virtually private enterprises financed by public funds as long as they remained in charge. They were creators of the utility, the same as many of the private utilities were creations of one man. But in the municipal utility when that man dies or is retired, look out for politics.

Consistent Constants Now

MAKING metering less complicated, hence more economical and efficient, is an objective which wins the approval of all concerned. But efforts to reach this objective must start in a field littered with dozens of viewpoints on a variety of problems in themselves complex. Attainment of a new, common viewpoint obviously is not simple and can be realized only after foresight has led to the sacrifice of some individual opinion on the altar of the greater, common good.

In its patient effort to sweep the whole field clean, the Meter and Service Committee of Edison Electric Institute has been tackling the obstacles one by one. There were the earlier efforts to standardize, and thereby reduce, the number of meter ratings. Right now, emphasis is on the suggested specifications for standard dial constants, and these suggestions are set forth in the Institute's Bulletin MS-1. The suggested standard provides one more opportunity for the expression of a common service-utility viewpoint, which is the principal prerequisite to the manufacturers' following through.

Life In It Yet

TWO years ago when the National Adequate Wiring program started, a punch drunk industry did not expect much of it for a long time. Had it not beat its head against the immovable forces that kept wiring inadequate for years, with a headache as the only result? What could be expected from a new program anyway? Yet the program has made important strides forward. With new wires it even gives promise of going back over lost ground to gain that back to adequacy. Life stirs in wiring at last.

NEWS OF THE INDUSTRY

SHASTA DAM PRICES AND PLANS REVEALED

That the Reclamation Bureau will complete, arrange for the marketing of water and power and will operate the Shasta Dam project upon its completion was made clear by USBR representatives at a meeting with the California Water Project Authority in San Francisco recently. At the same time the bureau revealed preliminary prices for Shasta Dam power and divulged its tentative cost allocations.

Under present plans the Bureau will build a transmission line from Shasta to Antioch, a substation at the latter place and in all probability a steam plant for standby and for firming up Shasta power. This latter is not included in the $228,000,000 budget for the project. Bureau engineers estimate that a 109,000-kw. steam plant costing $10,878,000 would be adequate.

Power rates to prospective purchasers (municipalities and governmental agencies would be given preference) would be 4.28 mills per kw-hr. for firm power and 1.46 mills for secondary with delivery off the Antioch substation busbar at 66 or 110 kv., including steam standby. If the Bureau is to build and operate sub transmission facilities for delivering power to prospective purchasers (lines are estimated to cost an additional $23,000,000) the rates for electricity will be 5.18 mills per kw.-hr. for firm energy and 1.77 for secondary. It is estimated that the project including the steam plant will produce annually 405,000,000 kw.-hr. necessary for pumping, 834,000,000 kw.-hr. of firm power and 196,000,000 kw.-hr. of secondary which will be available for sale.

Present estimates of cost allocations as between power and other uses set the value of power facilities at 40 per cent of the $103,000,000 cost of Shasta Dam. On the rate proposed the annual revenue from power sales is estimated as $7,202,000 against operating costs including amortization of $6,652,000.

The future position of the California Water Project Authority in connection with the project was still unclarified after the meeting, which had been called at the request of state officials. Bureau representatives indicated the Authority would be given the same consideration as other possible purchasers of water or power provided it could show potential uses and financial ability to meet obligations.

BEAVERS AGAIN

Mother Nature is no slacker when it comes to so-called "sabotage," but a good observer of her habits can find a solution. Workmen and officials of Washington Water Power puzzled long over the mystery of a 14-in. drain pipe, repeatedly each night being refilled. The pipe served as a source of drain for a pond in Hangman creek, which was to have its course deflected, so that workmen could lay water pipes across the creek bed to a new power substation.

Each morning workmen found the big pipe plugged up with branches, and dirt effectually preventing the pond's draining and permitting it to refill during the night. Several days' observation on the part of one of the crew members of this type of workmanship gave one man an idea. One night, returning soon after the others had left, he saw confirmation of his suspicion, when a band of beavers appeared and started to fill the pipe.

★ Ickes, despite Federal Government statements that Shasta minimum sale price is estimated at 8.2% below competition, urges formation of municipal power districts to distribute this electricity.

PUDS HAVE RIGHT TO INVEST IN OWN BONDS, SAYS COURT

Under a ruling of Attorney General Hamilton, Olympia, Wash., a public utility district has a right to invest in its own bonds. After final settlement with the Grays Harbor Railway & Light Co., PUD No. 1 of Grays Harbor County will have approximately $32,000 in customers' deposits, and the district planned to invest a portion of that fund in the district's own bonds. Legality of such investment was questioned, but Hamilton rules this may be done, if the bonds were purchased at not more than par.

A reasonable construction of the "Public Utility District Act", he declares "would allow the district to purchase its own bonds with such fund, thereby saving money necessary to the district to carry out the purposes of which it was organized, and serve the customers at the lowest possible price."

PUD FIGHTS CONTINUE IN WASHINGTON

An order giving the public utility district the right to condemn properties, including franchises, in Grant and Douglas Counties (Wash.), of the Washington Water Power Co., was recently signed by Judge E. W. Schwellenbach, who denied the motion of attorneys Alan G. Paine and H. E. T. Herman for the company, asking reconsideration of the decision which he made some time ago. Company attorneys indicated that they would take the question to the supreme court for final decision. E. K. Murray of Tacoma represented the PUD.

In Spokane, attorney E. K. Murray, representing Lincoln county No. 1 Public utility district, and Alan Paine and H. E. T. Herman, Washington Water Power attorneys, recently appeared before Fred Witt, judge of superior court in Spokane county, to argue what the language of the decree in the public utility district's condemnation suit should be. Determination involved the point of whether an order of public use and necessity allowing the PUD to take property in Lincoln County would require a new resolution or whether the original resolution, which included Spokane and Grant County property, could be amended, since Judge Witt had held that the Lincoln County PUD could not condemn property of Washington Water Power in Spokane and Grant counties as well as in Lincoln county. Judge Witt had granted a permanent injunction to the Washington Water Power Co. against the Lincoln County PUD to restrain the PUD from condemning company property in Grant County, serving 136 electrical customers, and property in Spokane County serving 84 electrical customers.

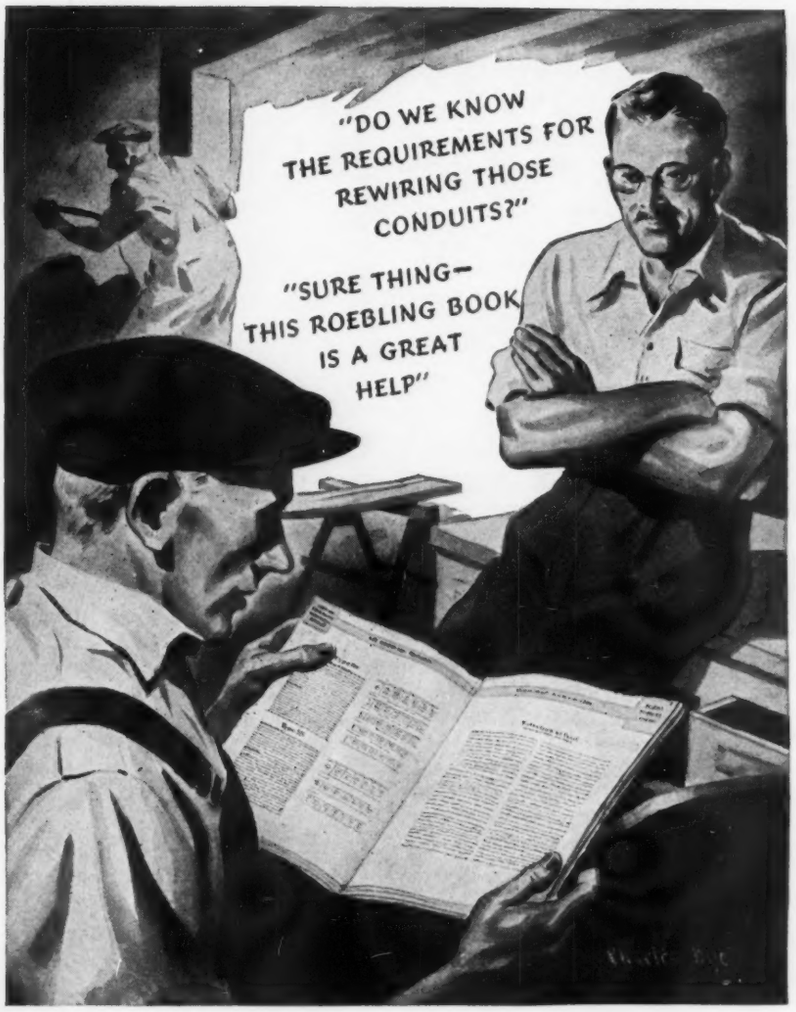
At the time of the formation of the Lincoln County PUD, its district included company property in Grant and Spokane Counties. Contention of the company was that the district was exceeding its legal right in attempting to seize property outside its county boundaries.

According to Judge Witt's statement, at the time a public utility district is formed, it makes its own rates without right of appeal to the public service commission, whereas rates fixed by a private utility are subject to appeal.

HERE IT IS!

The How, When, and Where of SMALL DIAMETER (THIN-WALL INSULATION) BUILDING WIRE

Roebling Catalog gives helpful data for quickly selecting *Insulation—Wire Sizes—Current Capacities—Number of Conductors*—valuable aids in the solution of specific installation problems.



SEND FOR FREE COPY

Right now, when building and plant circuit capacity must be expanded... when current loads must be stepped-up in existing conduits...Small Diameter Building Wire is the answer to your problem.

But, you ask—what are the Code Regulations? How many conductors can we use in each conduit? What insulation is most suitable for our need? These questions, and many more, *must* be answered before work can proceed.

And *Here's* the book to help you!

Just off the press—this Roebling Catalog compiles for you up-to-the-minute data. Wire Sizes... Current Capacities...Problems and Answers... these are the vital subjects covered in this catalog of Building Wire, No. 103.

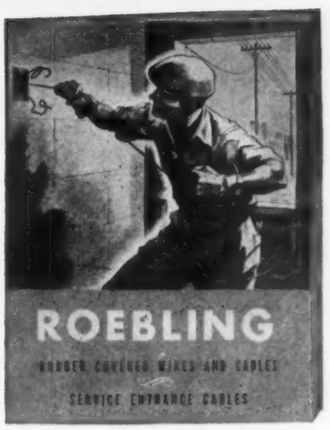
Why not write for your copy today? No obligation.

Roebling Small Diameter Building Wire is made in

FOUR TYPES OF INSULATION:—

RHT—*Rubber Covered*... RPT—*Rubber Covered*
RU—*Latex Covered*... SN—*Synthetic Covered*

JOHN A. ROEBLING'S SONS CO., OF CALIF.
San Francisco Seattle Los Angeles Portland



Ask for Catalog No. 103

ROEBLING SMALL DIAMETER BUILDING WIRE

Hence, continued Judge Witt, an attempt to include company lines outside Lincoln county is not only illegal, but unfair to the customers served, since these customers, who live outside the county, had had no opportunity to vote for or against the formation of the district and since they, in event their rates should be fixed higher than those within the county by the PUD, would have no right of effective protest against this discrimination.

★ Another typical PUD situation — Wash. commissioners recently rejected a proposal by Guy C. Myers to arrange financing and sale of Whatcom County PUD No. 1 bonds in favor of a plan to sell bonds through competitive bidding. Myers proposal would have cost the district $82,000.

Nevada Commission Approves Contracts

Contracts for an additional six million kw. of Boulder Dam power for the Lincoln County Power District and eight million additional kw. for the Southern Nevada Power Co., which serves Las Vegas and vicinity, were approved by the Nevada Colorado River Commission at a meeting in Carson City last month.

The new contracts bring the total for the Lincoln County Power District, which serves Pioche and other Lincoln County consumers, to 15 million kw. per year, and the Southern Nevada Power Co. to 20 million.

An application from the Overton Power District for an additional 650,000 kw. per year was taken under consideration, as it must be referred to the REA in Washington, which aided in financing the district. The Overton Power District now has a contract for 150,000 kw. per year.

At the commission meeting the status of the recently enacted bill amending the Boulder power law was discussed. The bill, one provision of which provides for payments of $300,000 a year to Nevada from Boulder power profits, must be ratified by the various power users, including the City of Los Angeles, before it becomes effective. In order to ratify the act an amendment to the Los Angeles city charter must be voted on at the November election and then submitted to the California Legislature for approval. Since there appears to be no opposition, members of the commission were informed, it is expected that the act will be ratified by the first of the year. Other power users will ratify it in the meantime and the law should become effective shortly after Jan. 1, it was stated.

Members of the Nevada commission include Gov. E. P. Carville, A. M. Smith, Albert J. Caton, Ed Clark, and C. F. DeArmond.

Tuscon Gas & Electric Signs Federal Contract

The Arizona Corp. Commission recently approved a contract between the Tucson Gas, Electric Light and Power Co. and the Federal government for extension of the Parker Dam-Phoenix power line to Tucson and delivery of not less than 15,000 kva. of electricity to the company.

The contract, which runs for 10 years after the initial delivery of power, calls for construction of a wood-pole power line at the government's expense and delivery of power at the rate of two mills per kw.-hr. W. M. Cox, chairman of the commission, said.

However, in addition to this cost, the company would be required to pay $9,300 monthly on the power line as a "readiness to serve" fee.

The company would be required to purchase a minimum of $68,400 worth of energy annually, and the payments on the power line would increase this annual minimum cost to $180,000.

Completion of the line, it was pointed out, will afford the city protection against a recurrence of the interruption to service caused by the recent rainstorm that damaged the company's plant and resulted in a 60-hour "blackout" for the city.

The new power line will be more than 100 miles long and will increase to 290 miles the length of the line from Parker Dam.

Irrigation District Seeks Shasta Power

Glenn-Colusa Irrigation District with 15,000 potential consumers of electricity last month sought means of obtaining cheap power to be generated at the Shasta Dam of the Central Valleys Project.

The district asked the California Water Authority for information on how to proceed and methods of financing to be followed in constructing the necessary distribution facilities.

State Director of Public Works Frank W. Clark, chairman of the authority, said the application will be presented at a meeting of the authority with the State prepared to give "every assistance to the district."

Pointing out that the district, with an area of 122,000 acres, is the largest in the Sacramento Valley, Clark declared distribution by it would bring public power to most of the west side of the valley.

The district is allowed by law to distribute power as well as to furnish water to consumers. Attorney Jackson J. Hankins of the San Francisco firm of Hankins & Hankins, counsel for the district, informed the authority the district's power requirements at present are 5,000,000 kw.-hr. per annum.

This power, purchased from Pacific Gas and Electric Co., is used to lift water from the Sacramento River for irrigation needs. Hankins did not estimate the amount of power which would be needed in case the district begins distribution to individual consumers.

"We believe," Hankins wrote, "the district could easily deliver power to all the territory from Hamilton City west to the foothills and could go south as far as Arbuckle in Colusa County, covering all the territory of the Sacramento River west to the foothills.

"In this territory the district would be serving power to the towns of Hamilton City, Willows, Princeton, Grimes, College City, Orland, Colusa, Williams, Maxwell, and Arbuckle. In the territory there would be in excess of 15,000 possible users."

The district's boundaries are from Hamilton City in Glenn County, close to the Tehama County line, to three miles south of Williams in Colusa County, a distance of 65 miles.

★ Thus begins a "Bonneville trend" of public power from Shasta for thousands of private utility customers.

Los Angeles to Vote on Boulder Dam Power

Two charter amendments, to permit the city to take advantage of the reduced rates on Boulder Dam secondary power, will go on the Nov. 5 general election ballot, the Los Angeles City Council decided last month in instructing City Attorney Chesebro to prepare the necessary formalities.

The request came from the Dept. of Water and Power and was presented by Councilman Roy Hampton. The expense, $60,000 or $70,000, will be borne by the department, which will stand to profit by $1,000,000 a year.

Amendment No. 1-A, if adopted, will abrogate the old 1930 contract between the city, Federal government and Southern California Edison Co., and authorizes new ones, while No. 2-A, if adopted, will permit the free interchange and sale of electric energy between the utilities, a request which came from the National Defense Council so the utmost use may be made of the Colorado River power.

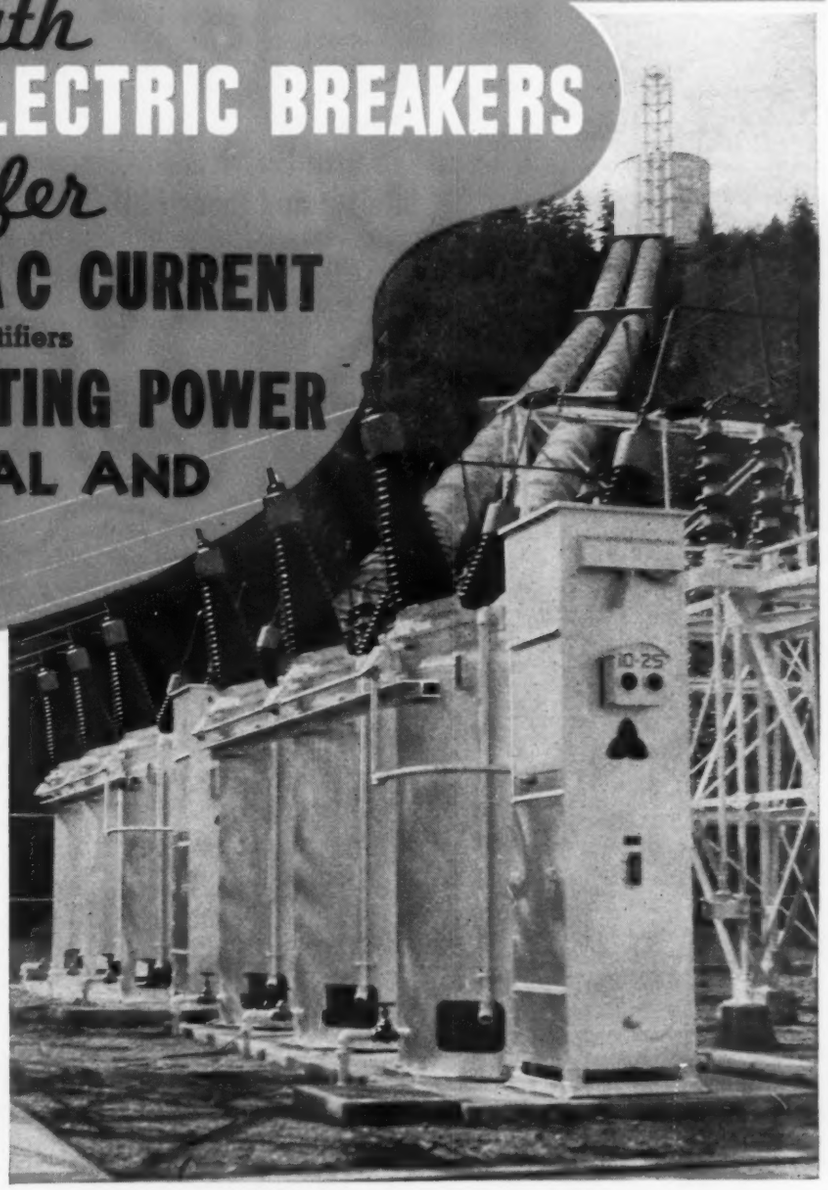
Reliable Motor Control

with PACIFIC ELECTRIC BREAKERS offer

CLOSING ON A C CURRENT
without rectifiers

SMALL OPERATING POWER

FAST MANUAL AND ELECTRICAL CLOSING



Type RWE, 115 to 287 kv.

The reliable performance records of the exclusive Motor Controls used with Pacific Electric Breakers have won a nation-wide reputation for long-lasting, trouble-free service.

The Motor Control is economical to buy and it costs less to install. There are no expensive station batteries nor heavy cables. The power for fast interruptions and reclosures is stored in strong motor-wound springs. Therefore, manual closing is just as fast as electrical closing. Being simple of design, the Motor Control is proof against improper operation.

Pacific Electric Breakers have other exclusive, reliable advantages. You get the Arc Expulsion Chambers which assure long-lasting contacts, fast arc extinguishment and very little oil carbonization. The Bevel-Link Drive insures accurate blade motion. The breaker stays in perfect alignment.

You get a liberal SAFETY FACTOR—no oil throw, no excessive tank pressures, great mechanical strength—and More!

Here is the breaker, backed by 34 years of specialized manufacturing experience, that is your assurance of utmost line protection —at low cost. Get all the facts.

Highly "Efficient"

You want durability, low maintenance, less bother, fast synchronizing, extra safety and reliability. You want the finest bushings, finest craftsmanship and utility-tested design. Pacific Electric gives you all of this at low cost. That helps make your system more efficient. Write for complete data and descriptions.

C. H. CUTTER
1006 Securities Bldg.
Seattle, Wash.

G. B. KIRKWOOD
437 S. Hill St.
Los Angeles, Cal.

URBAN HALLIDAY
230 U. S. Nat'l Bank Bldg.
Denver, Colo.

J. E. REDMOND CO.
448 W. Madison St.
Phoenix, Ariz.

Other Representatives in Principal Cities

Pacific Electric Mfg. Corporation

5815 THIRD ST., SAN FRANCISCO, CALIF. DUNES HIGHWAY, GARY, INDIANA

Spokane Group Petitions for Public Power

Recent developments indicate that municipal power may develop into an issue in Spokane. Circulation of petitions asking for a vote on organization of a public utility district in Spokane County has become active. Following the appearance of the petitions, the potent municipal power and light question claimed the attention of the city council, which laid the groundwork for possible use of Grand Coulee power distribution in Spokane through a municipal system by including in its preliminary 1941 budget an estimated $15,000 for a survey of the cost of establishing a city electrical distribution system.

Inclusion of the estimate for the survey was made by the city council, meeting in the committee of the whole, as the budget for the coming year was reported out for publication, and was sponsored by Commissioners Otto Dirkes and Ralph Hendricks. Little opposition was expressed to the inclusion of the survey item, although according to reports Mayor Frank Sutherlin was not entirely favorable to the proposal.

In commenting on the move, Commissioner Dirkes stated that he felt it very important at this time to obtain the most complete and accurate information for the people of Spokane as to the cost and expense of purchasing of or constructing an electrical distribution system within and for the city of Spokane, and that the $15,000 would be sufficient to conduct a comprehensive survey.

According to Mayor Sutherlin's belief, the sum would be merely a starter, and that this action brought about the visualization of competitive sale of power. Further, setting up a municipal light and power system would involve a great sum of money.

Commissioners Hugh English and A. B. Colburn indicated that the survey to find out the facts was necessary.

It is expected that this survey would determine the cost of a new plant and system as compared with the present privately owned system, the cost of which would also be determined, and that it would clarify the matter of competition with the Washington Water Power Co. or purchase by condemnation of the company system.

It is further said that results of circulating PUD petitions will have a definite effect on the alternative of proposing municipal light and power distribution, depending upon success or failure of the petitions in securing a place on the ballot in November, since many officials believe municipal ownership and operation a better form of

● The City of Grand Coulee, Wash., will file a second application with the RFC for a loan to finance the purchase or construction of a publicly-owned power and light system. Plans for purchase of the Cashmere Power & Light Co. have made no progress. A committee has been appointed to sign up prospective customers to show the private utility that it would lose most of its business if the city built a rival network.

Oregon Districts Both Reject and Favor PUD

Two municipal elections in Oregon in September, involving the public power issue, resulted in a 50-50 outcome. The town of Woodburn returned a 22 majority vote in favor of amending the city charter to authorize the municipality to go into debt to the extent of $65,000 of bonds to go into the power business. The vote was 259 for to 237 against. The idea advanced by the proponents was to purchase the distribution properties of the Portland General Electric Company within the city limits and buy Bonneville power. No agreement has been reached for the purchase of the company's property.

Ten days later West Salem, also served by Portland General Electric Company, turned down a proposal to issue $80,000 in bonds for a similar purpose. The vote was 110 for to 281 against.

Puget Sound Power Fights for Rights in Whatcom Case

Notice of appeal to the United States Circuit Court of Appeals from a decision of a Federal court in Bellingham, Washington, in the Whatcom County condemnation case has been filed by the Puget Sound Power & Light Co., Frank McLaughlin, president of the company declared.

The decision from which the company appealed fixed $5,000,000 as the price the Whatcom County Public Utility District should pay in condemnation proceedings to acquire the company's Whatcom County properties.

McLaughlin said a fundamental question raised in the appeal was whether a public utility district under existing laws and court decisions has a right to condemn the company's property. The first step in the condemnation proceedings, he said, was the granting of a decree of public use and necessity to the public utility district. The company contended that the district was not entitled to such a decree, because of lack of necessity for taking the company's property, and absence of public benefits.

Carey New Asst. Chief on Bonneville-Grand Coulee Marketing

Charles E. Carey, chief consulting engineer of the Bonneville Power Administration, has taken over, in addition to his present duties, the post of assistant chief of the Administration's System Planning and Marketing Division headed by William A. Dittmer.

The appointment of Carey is in line with a program designed to broaden the activities of the Marketing division preparatory to assuming responsibility for the marketing of power to be generated at Grand Coulee dam as well as that being generated at Bonneville dam. Decision to make Bonneville the marketing agency for Grand Coulee power was announced at the White House in Washington.

The unification of the power programs of the two big Columbia river projects, plus the speed-up of transmission network construction, requires a closely knit relationship between the construction and power marketing programs, Dittmer said, pointing out that in effect Carey's new position would be one of coordinator between Bonneville's engineering and marketing divisions.

In Charge of Research

As chief consulting engineer, Carey is in charge of research into the long-time power needs of the Pacific Northwest and of developing a construction program to meet those needs. Under the new arrangement, Dittmer said Carey also will supervise a staff of experts who are devoting their time to the development of specific plans for coordination of the Northwest's power resources and facilities and investigation into the technics of supplying existing and potential power markets.

Assisting Carey in his work will be a consulting engineering board, which will conduct power studies regarding the development, utilization and unification of Columbia River power and other power resources of the region; a power planning unit which will conduct hydraulic and hydrologic studies of existing power resources, and a system development unit which will handle details of planning construction and acquisition of transmission lines.

Other Officials

Other officials of the division which Carey joins are Ivan Bloch, chief of the market development section; Warren H. Marple, chief of the distribution projects section; Barclay J. Sickler, chief of the rates and utilization section; H. E. Bixby, chief of the distribution operations section; and James N. Bender, acting chief of the system acquisition staff.

Henry Bulbsnatcher's last stand!

Observe the final desperate plight of the chronic bulb-snatcher! He has robbed one socket to fill another until he is down to the last bulb in the house. If anything happens to that we can foresee only the breakup of a once happy home. The one hope is that with no more bulbs to snatch, Henry will begin life anew by treating himself to a flock of new G-E MAZDA lamps.

May we suggest that you do the same thing yourself before you become a slave to the sly habit of bulbsnatching? Check up now. Do the bulbs in each of your reading lamps total at least 100 watts, well-shaded? (Some need more.) Are they made by G-E? The right bulb can make all the difference between comfort and eye-strain! Get the right size—and insist on the G-E monogram!

THIS COPY GOT A TREMENDOUS READING in a full page G-E ad in the Saturday Evening Post. It typifies General Electric's exclusive "bulb-snatching" story which is being plugged constantly in magazines and radio. Surveys show this "theme" has got all America talking about the need for keeping more right-sized bulbs on hand. If you don't believe it, ask your own family!

G-E MAZDA LAMPS

GENERAL ELECTRIC

Bonneville and Grand Coulee Under Single Agency

President Roosevelt last month issued an executive order placing the power from Bonneville and Grand Coulee dams under a single marketing agency as a measure of coordinating power for national defense.

The order came on the eve of the acceptance speech of Senator Charles L. McNary of Oregon, Republican nominee for the vice presidency. Apparently with this in mind, White House Secretary Stephen Early said: When the President signed the executive order today, he expressed the very sincere wish that neither Washington nor Oregon would enact any state laws that would prevent municipalities or cooperatives from having the fullest utilization of the power created at the Bonneville and Grand Coulee dams."

Previously the White House had declared that uniting the power program under a single marketing agency would "carry the low cost power from both developments throughout the Pacific Northwest."

Earlier the President had asked congress to appropriate $3,850,000 to expand the Bonneville power project and its distribution system.

In an accompanying letter, the budget bureau said there is an estimated normal deficiency to be supplied by Bonneville and Grand Coulee of 229.000 kw. in 1942 and 360,000 kw. in 1943.

★—Another TVA situation looms up in the Pacific Northwest as the big giant dams are consolidated in a bigger push to sell cheap power to that area. Praises of this power for the defense industry seem to have fallen flat because the defense commission decries the fact that the Columbia River just isn't located in the right place geographically. It's too long a haul from markets and from the center of the Army's armament activity, say experts.

Grays Harbor PUD Plans Control of Resale Rates

Aid in developing plans for system-wide acquisition of the Puget Sound Power & Light Co. properties in the Northwest has been asked of the Bonneville Power administration by the Puget Sound Public Utility Commissioners Assn., joined by former members of the Consumers Non-Profit Public Power Corp. A resolution seeking Federal aid has been signed, asking Dr. Paul J. Raver, Bonneville administrator, to assign staff members to work with association representatives in perfecting plans to acquire the company's properties.

The Association also instructed its committee to consult with Mayor Arthur B. Langlie and members of the city council of Seattle, with a view to their working out a plan for the city's purchase of the private utility's holdings.

A. G. Ziebell of Marysville, president of the association, said "the association and the committee had no intention of entering into competition with City Light, or of intruding in its field. We are hopeful, however, that the city and City Light will avail themselves of the opportunity to acquire and operate Puget Sound properties in Seattle, at the same time the utility districts acquire the properties outside of Seattle. In that way, several charges can be avoided which would result in an estimated saving to City Light of $3,000,000 in the acquisition of the private company's property here."

PUD Group Asks Bonneville Aid in Acquisitions

The Grays Harbor PUD, Aberdeen, Wash., and the Bonneville authority are "closer to agreement" on a power purchase contract than at any time since the PUD began operating its system in January, according to Robert W. Beck, district engineer. A tentative agreement is being drafted into legal form and will be presented to the PUD commissioners in about two weeks, it was stated. The suggested contract, Beck said, leaves the PUD in sole control of Bonneville power resale rates to Harbor consumers. "Under this contract" Beck stated, "the PUD would gain control of resale rates, keeping the present ones until it is feasible to lower them. Meanwhile, we would exert every effort to attain the 'objective rate' set by Bonneville."

The resale provision was one of several stumbling blocks to contract agreement between Bonneville and the PUD, all of which have been ironed out, with Bonneville giving in to the district on virtually all points. With rehabilitation of the Raymond-Cosmopolis line set to be completed about Oct. 1, Bonneville power could come to Grays Harbor immediately after a sub-station at Cosmopolis is built, Beck said, if the proposed power contract is signed. The Bonneville people agreed, among other things, to build the Cosmopolis sub-station.

"Actually, the signing of the contract will be more advantageous for Bonneville than for the Grays Harbor PUD at the present time," Beck declared. "We are making power cheaper than we can buy it from Bonneville. However, the contract is an investment in the future in that it will guarantee us an ample supply of power. It means the district will not have to spend its own money for new construction to increase its power output."

Alcoa Plant Begins Production in Washington

Delivery of power to the Aluminum Company of America's Vancouver, Wash., plant was begun by the Bonneville power Administration and the company started test operations preparatory to aluminum production.

Actual production was expected to start in about ten days, with the company planning to produce about sixty million lb. of aluminum annually, a large share of which will be shipped to airplane factories in connection with the national defense program.

About 500 men are now employed at the plant, the preliminary power being used to bake out some of the plant's equipment prior to full capacity production.

Power was sent flowing into the huge Alcoa plant after Bonneville Administrator Paul J. Raver ordered the switch closed, slightly over eight months from the day the first of the two 32,000 kw. contracts was signed.

While the huge Alcoa plant was being constructed, the Bonneville administration completed and energized its major high voltage transmission lines bringing power to the Portland-Vancouver area and constructed a special 115,000-volt feeder line from its Ampere, Wash., substation to the Alcoa factory.

When at full production the Aluminum Co. plant will use 65,000 kw.

★—If there was any real defense advantage to be gained in Bonneville and Grand Coulee power, the defense commission wouldn't object in helping Raver sell the Pacific Northwest. (See p. 72, col. 1.)

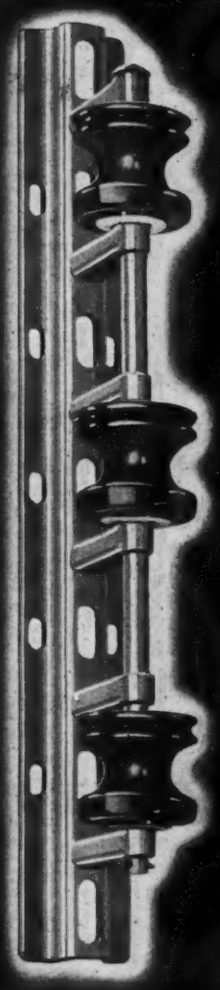
Bonneville To Set Up Spokane Office

The northwestern corner of the State of Washington and northern Idaho will be served by a Bonneville-Grand Coulee Power Administration district office at Spokane, Bonneville Administrator Paul J. Raver declared last month. Bids have been invited for office space in Spokane's metropolitan area and Glenn H. Bell has been named acting manager.

The office will serve as a point of contact between the Power Administration and the residents of Okanogan, Ferry, Stevens, Pend Oreille, Spokane, Lincoln, Adams, Whitman, Garfield, and Asotin counties, as well as the Panhandle district of Idaho.

Inquiries relative to purchase of power and requests for all types of information concerning Bonneville will be handled through the Spokane office. The Power Administration will continue to maintain its branch office at Yakima.

HOLDING THAT LINE



Since way back when

Since way back when Taft was in the White House and Ty Cobb was stealing third, L-M Secondary Racks have been "holding that line". Good steel, good galvanizing, good porcelain . . . these ingredients of every L-M Secondary Rack have proved more than a match for all the strains the years could bring. This staying power of L-M racks is characteristic of all the L-M Pole Line Construction Materials which have "held the line" for utility men through thirty eventful years. You will worry less about sleet and wind, you will save more on lowered maintenance costs wherever L-M Pole Line Construction Materials hold your lines.

LM

LINE MATERIAL CO.

New Industries Declared "Ready" for Bonneville

Prospects for location of two large new industries in the Portland area and the outline of a bill already drafted but not presented to Congress which would give the Bonneville power administration authority to acquire public utilities on a system-wide basis were disclosed by Administrator Paul J. Raver.

Returning from Washington, D. C., where he was given authority by the president to market Grand Coulee as well as Bonneville power, Dr. Raver disclosed:

1. That the great Swiss aluminum company which dominates that industry in Europe is "definitely interested" in a Portland area location and utilization of Bonneville power. Representatives from Switzerland are expected here this month.

2. That the Reynolds Metal Co. of Richmond and Louisville, which recently obtained a $15,800,000 reconstruction finance corporation loan to build a new plant, "has asked us to find a 500-acre site" in the Portland area.

3. That he had asked for legislation to give Bonneville "authority for system-wide acquisition of electric utilities" to be operated in co-operation with public agencies—Bonneville to retain generating and transmission units, and the PUDs, municipalities or other public agencies to take over distribution. The interior department has roughly drafted this bill, he said, but no steps have yet been taken for submission to Congress.

The Swiss aluminum company is the firm with which Senator Charles L. McNary of Oregon opened negotiations some time ago. Dr. Raver said the senator referred the firm's New York representatives to him.

The Reynolds company, Dr. Raver said, wanted a 500-acre site on tidewater, adjacent to supplies of lumber and pulp, and with a guarantee of 30,000 kw. of power within six months. This company also turns out aluminum products. It started as a producer of foil, now markets cartoons, boxes, insulations and many other products.

Bonneville Film "Hydro" To Help Attract Customers

A two-reel moving picture portraying in glowing terms the bounties being made available by the Federal Government's Bonneville and Grand Coulee hydro-electric power projects is being filmed by the Bonneville Administration.

The film is expected to be titled "Hydro" and will be used in the dual function as a sales argument by the Bonneville marketing division in seeking to attract industries to the Pacific Northwest with "cheap power" and as an "educational" film for display by local civic groups. The film will be released before next Spring.

Seattle City Light Declares New Commercial Rates

Effective after October 1 were new lighting rates by Seattle City Light which will amount to a $251,000 savings to electric customers, or a total of $663,000 within the last thirteen months. Commercial lighting monthly rates are now as follows:

For the first 100 kw.-hr. per month, 3.5 cents per kw.-hr.; for all over 100 kw.-hr. per month, 1.5 cents per kw.-hr. Industrial power rates were listed as 3.5 cents per kw.-hr. for the first 100 kw.-hr. For all over 100 kw.-hr. per month, 1 cent per kw.-hr. Customers who sign a 10-year contract with the City Light are allowed a 10 percent discount on all bills under these new schedules.

West Coast Cuts

New electric rates filed Aug. 28 with Ormond R. Bean, utilities commissioner of Oregon, will provide electric service at substantial savings as compared to the rates heretofore in effect, according to W. C. MacInnes, president of the West Coast Power Co.

The new rates, which became effective Sept. 15, and which will be first shown on bills rendered in October, apply to the company's coast division.

The total savings under the new rates will total $18,540 annually, of which $10,940 will be shared by the residential customers and $7,600 will be for the benefit of the commercial users of electric service.

The new residential rate provides for a minimum charge of $1 per month, which includes 15 kw.-hr.

McMinnville $45,000 Saving

The McMinnville (Ore.) City Light Dept. informed Bonneville Power Administrator Paul J. Raver last month of new rate reductions which will save McMinnville electric users approximately $45,000 annually. New schedules will be retroactive as of Aug. 15, with first bills under the new rates payable Oct. 1, the date on which the Bonneville Power Administration will make initial delivery of Columbia river power to McMinnville's municipal system.

Savings to McMinnville's domestic power customers will average 27 per cent, Milton H. McGuire, City Light Superintendent said. Savings to commercial customers will average 31 per cent, he said.

New residential rates follow in detail:

	Bonneville Standard Rate	Temporary Surcharge	Total
First 50 kw.-hr. per month	3c	½c	3½c
Next 50 kw.-hr. per month	2c		2 c
Next 200 kw.-hr. per month	1c		1 c
Next 900 kw.-hr. per month	½c		½c
Over 1,200 kw.-hr. per month	¾c		¾c

Commercial customers will benefit from rates ranging as low as 3/10 of one cent per kw.-hr. For customers having a monthly demand of more than 10 kw. a demand charge of 95 cents per kw. applies.

The new commercial rate is as follows:

	Bonneville Standard Rate	Temporary Surcharge	Total
First 150 kw.-hr. per month	3c	½c	3½c
Next 350 kw.-hr. per month	2c		2 c
Next 1,000 kw.-hr. per month	1c		1 c
Next 13,500 kw.-hr. per month	0.8c		0.8 c
Next 25,000 kw.-hr. per month	0.6c		0.6 c
Next 60,000 kw.-hr. per month	0.4c		0.4 c
Over 100,000 kw.-hr. per month	0.3c		0.3 c

Portland G-E to Reduce

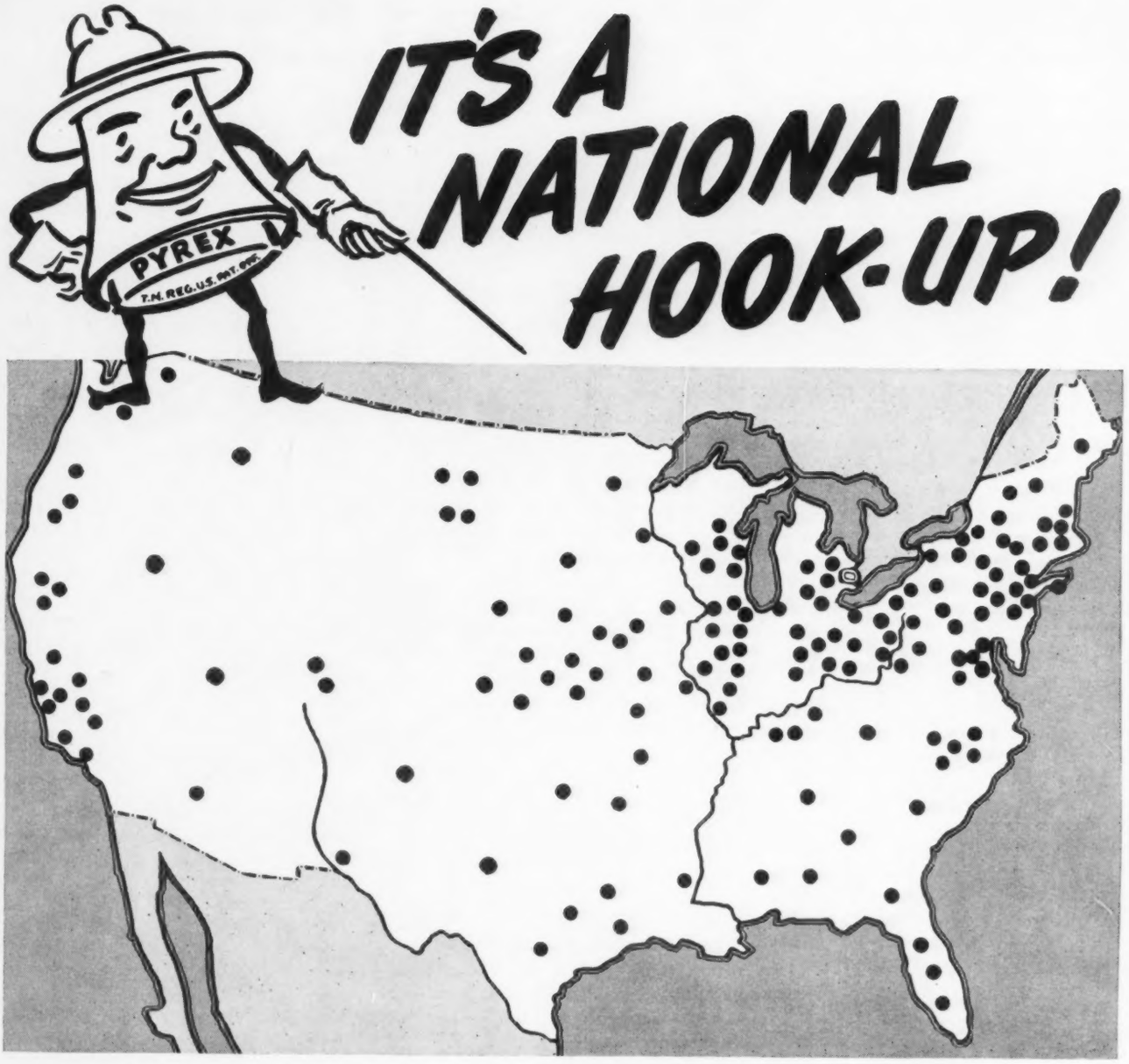
Portland General Electric Co. declared recently that it would publish "in a matter of weeks" a rate schedule for further reductions to commercial users.

Ormond R. Bean, State Public Utilities Commissioner, said the new schedule—proposed by the company in response to his letter last December asking revisions throughout the tariffs coincident with purchase by PGE of Bonneville power—would provide annual savings of from $400,000 to $500,000 to commercial customers.

Engineers of PGE and the commission are studying the residential lighting schedules, and further reductions in that field may result, it was indicated.

In five previous rate-schedule revisions this year PGE has effected customer savings of more than $1,000,000 and Northwestern Electric Co. about $700,000. There were two cuts in residential schedules and one each for commercial, industrial, and street lighting customers.

Commissioner Bean pointed out that "commercial schedules always have been too high in relation to industrial and residential schedules."



Pyrex Insulators are used by leading companies in every State in the Union!

TODAY, in 48 states from coast to coast, PYREX brand Insulators are serving more than 126 leading public utilities and private companies; giving 24-hour performance in heat, cold, rain and snow. Where the going is toughest, you can always depend on PYREX Suspension Insulators for (1) mechanical and electrical strength well above the average, (2) superior long-time strength, (3) higher impact-resistance, and (4) greater resistance to temperature changes. Marked points of superiority will likewise be found in PYREX Pin Type Insulators. Twenty-one agents are conveniently located to serve you. Contact your nearest agent or write us direct for full information. Corning Glass Works, Insulation Division, Corning, N. Y.

CORNING *means* Research in Glass

Pyrex Insulators BRAND

San Diego Gas & Electric Declares New Rate Schedule

A $200,000 a year reduction in rates of the San Diego Gas and Electric Co. was declared last month by the California State Railroad Commission.

Commissioner Justus F. Craemer said the new rates, effective Nov. 1, would save domestic and commercial users of electricity $125,000 a year.

The cut was announced after a conference of the commission with L. M. Klauber, vice-president of the company, and Walter Cooper, San Diego city rate expert.

A new tentative schedule for electricity was announced as 90 cents minimum up to 12 kw.; 3.1 cents a kw. for the next 38 kw.; 2.3 cents for the next 50; 2 cents for the next 100; and 1.5 cents a kw. for all over 200.

Craemer said final determination of rates would await settling of certain tax matters and completion of stock and bond re-financing in which the company is engaged.

Tombstone Rates

Tombstone (Arizona) residents who are using or expect to use electricity for heat, lights and refrigeration will have only one meter and one minimum from now on. The new rate provides for a $4 minimum for 50 kw.-hr., and anything over that will be 8 cents per kw.-hr. The next rate will be for those who use electricity for heat and lights only and will have a $3 minimum for 25 kw.-hr., with 12 cents per kw.-hr. for all over the minimum. The usual light rate with a $2 minimum will remain the same.

The adoption of the new rate scale was decided upon after W. N. Ewing, engineer, reported a shortage of 5-amp. meters and stated that the adoption of the proposed new schedule would do away with the present heat rate, which requires separate meters, and release more than a dozen good meters for regular service.

Mountain States Cuts

Savings of approximately $18,000 a year, involving patrons of the Mountain States Power Co. in the Marshfield (Oregon) vicinity, were declared by State Utilities Commissioner Ormond R. Bean recently.

The new combination rates, open to range users, are: First 28 kw.-hr., 5 cents per kw.-hr.; next 100 kw.-hr, 3 cents per kw.-hr.; all additional at 1.5 cents per kw.-hr.

The new rates replace a residential charge previously based on a room count. Elimination of this room count removes the last remaining demand feature in the residential rates in Oregon.

● INITIATIVE No. 139 has been certified for the November ballot in the state of Washington, having received the required 50,000 valid signatures, according to Secretary of State Belle Reeves at Olympic. This measure requires public utility districts to submit bond issue proposals to a vote of the people and is being strongly opposed by PUDs throughout the state.

Stone-Webster Picketed on Power Line Job

Buried in the wilderness of three Orange County canyons last month were 15 pickets, members of the American Federation of Labor, in a protest against the Stone-Webster Construction Co. of Los Angeles. The company is erecting a high power line reported to be used to carry electrical power from Hoover Dam to the Southland.

According to information obtained by Chief Criminal Deputy George Franzen of the Orange County Sheriff's office, the pickets formerly were employed on the project as laborers but were ordered to quit their jobs yesterday to picket for a closed-shop agreement.

"The striking picket men told me they had no fault whatsoever to find with their working conditions or hours and that they liked the Stone-Webster Co. fine," Franzen said. "The picketing is being used in an effort to obtain 100 per cent union labor on the job."

Picket lines have been established at entrances to Black Star, Silverado and Santa Ana canyons. The line, when completed, will run from Chino to San Juan Capistrano.

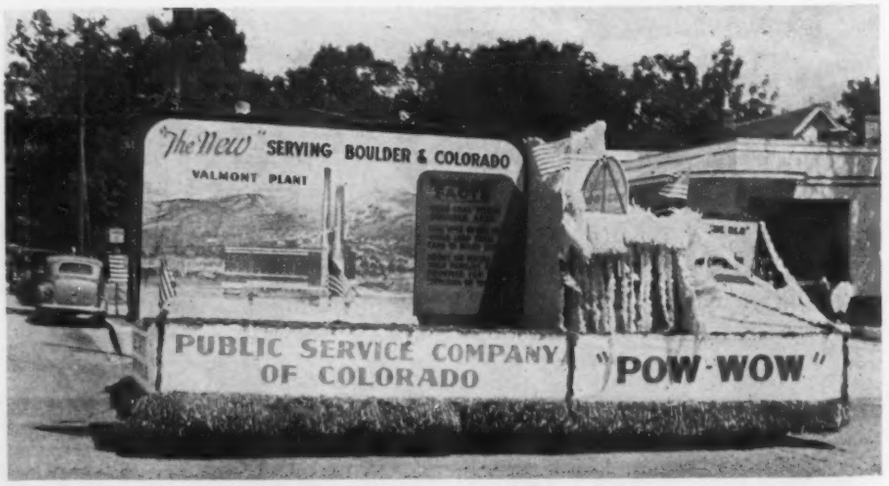
PUD Commissions Discuss Tax Question

In a joint meeting in Tacoma recently, representatives of the State Assn. of Public Utility District Commissioners, and representatives of the Assn. of Washington Cities, discussed the question of how to tax public utility districts for the benefit of cities and other political subdivisions.

Last June, the PUD association and cities' organization appointed committees to work together on a legislative program that would be mutually agreeable, and both groups are agreed, along with the Washington State Grange, that the districts should pay taxes equivalent to what the private companies are now paying.

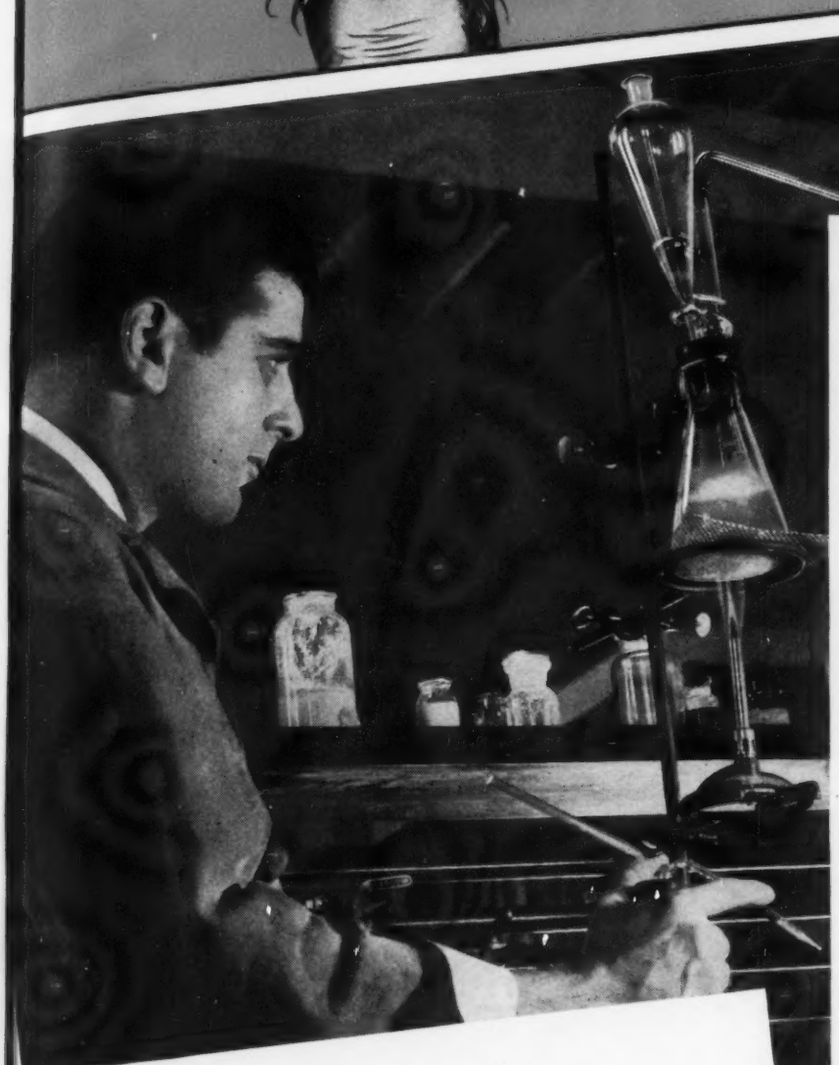
The question of whether cities should be included in power districts was also considered, and it was agreed that some mutually satisfactory plan could be worked out after the districts get into operation. The meeting resulted in appointment of Ray Hendricks to make a survey, with the help of the State Tax Commission, to find out what taxes the private power companies pay to cities, so that the joint committee can recommend a specific rate of tax on the gross revenues of PUDS, set at 5 per cent.

● ANNUAL REPORT of The Mountain States Power Co. for year ending Dec. 31, 1939, included a revealing note in the average annual use of electricity per residential customer. This showed an increase in kw.-hr. from 1,247 to 1.286. Average for the United States for 1939, according to the Edison Electric Institute, was 890 kw.-hr. This put the Mountain States figure at approximately 50% above the national average.



THE BOULDER, COLO., OFFICE of the Public Service Co. of Colorado entered one of the most beautiful floats in the annual Pay Dirt Pow Wow parade held recently. A huge painting depicting the Valmont plant of the company, located near Boulder, was used effectively with institutional facts

This man GETS IN PEOPLE'S HAIR



To see that you get the best cable possible he checks on all incoming materials...accepts only those that meet *Anaconda's Rigid Standards*

PERSONALLY, he's "tops" but when it comes to cable materials he's even harder to please than he is to fool. His eye is keen, his knowledge sound, his standards severe and he applies them all, accepting and rejecting the materials used in Anaconda Wire and Cable.

His task, and that of the other trained engineers and chemists entrusted with Anaconda research, is to protect quality...to insure that every length of wire and cable measures up to the name behind it...which means —flawless as the skill, science and long experience of Anaconda can make them.

40865

ANACONDA
from mine to consumer

• • •

A Wire and Cable for Every Electrical Requirement

The Anaconda line is complete, including standard and special power cables, rubber-covered wire, magnet wire and coils. Each product has benefited from Anaconda's continuous development and research program.

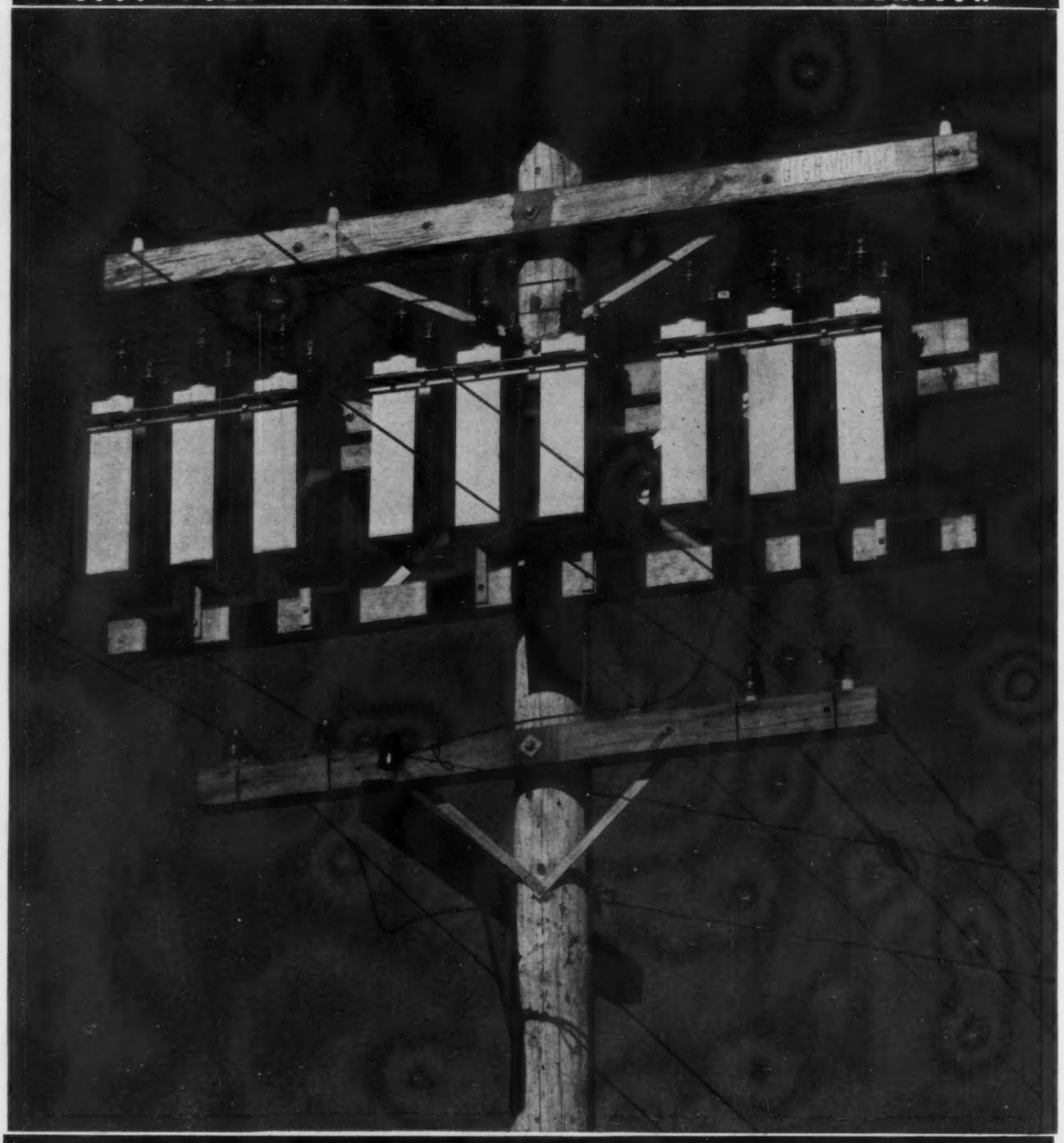
USE MODERN IMPROVED

Anaconda Wire & Cable

ANACONDA WIRE & CABLE COMPANY, General Offices: 25 Broadway, New York City; Chicago Office: 20 North Wacker Drive

A Subsidiary of Anaconda Copper Mining Company. Sales Offices in Principal Cities

4000 VOLT WEST COAST POLE TYPE INSTALLATION



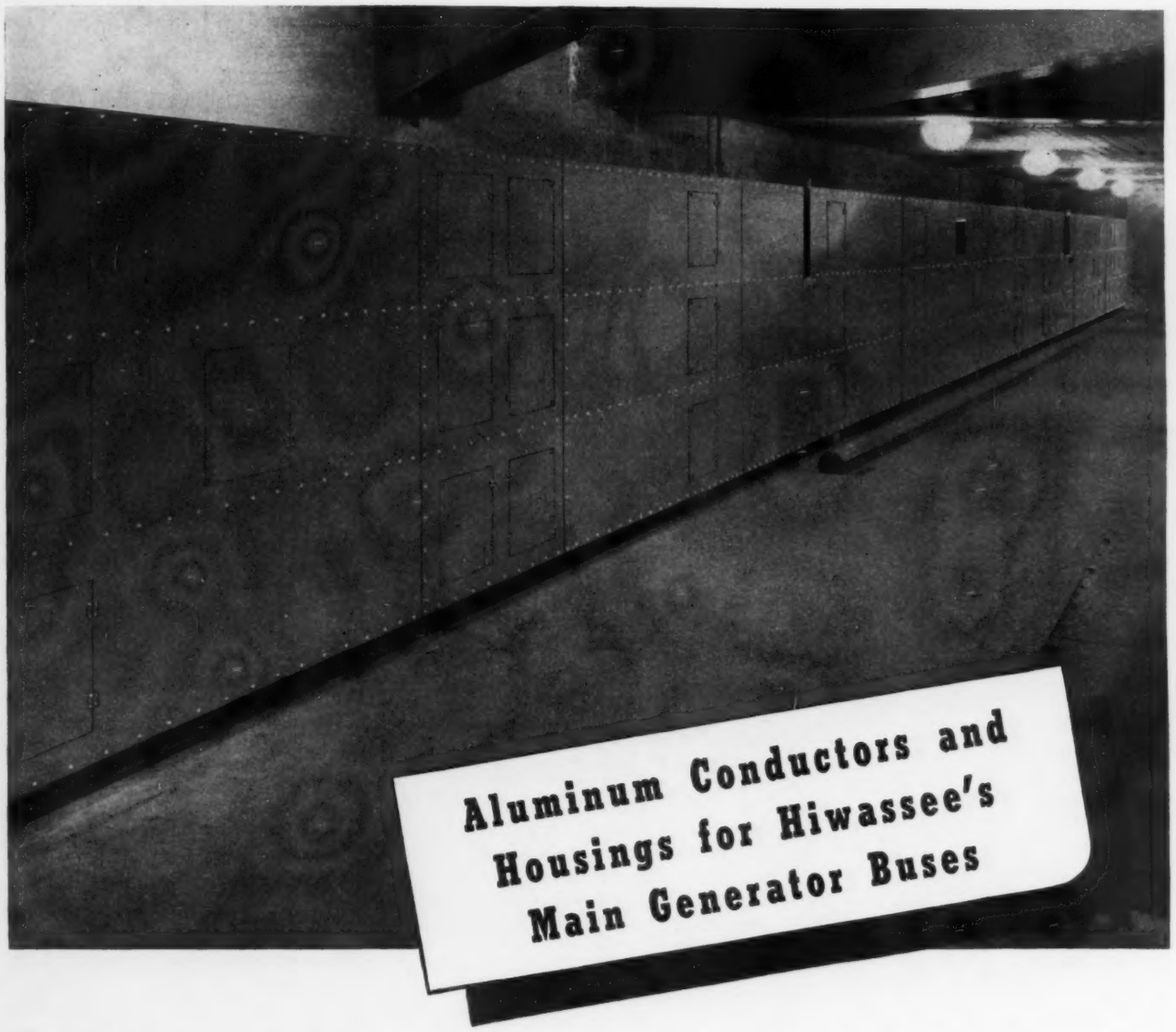
FAST CAPACITORS

for IMPROVED VOLTAGE REGULATION—BETTER POWER FACTOR
INCREASED REVENUE—CAPACITORS FOR EVERY INDUSTRIAL NEED

John E. Fast & Co.
Established 1919

3123 NORTH CRAWFORD AVE.
CHICAGO, ILLINOIS

West Coast Representatives: WALTHAM, DE WITT & KRUSI, 630 Monadnock Building, San Francisco, Cal.



The 3200-ampere generator bus at T.V.A.'s Hiwassee Dam project uses Alcoa channel conductors and is carried in this Aluminum housing. Because Aluminum is nonmagnetic, the heating effect of magnetic materials under similar load conditions is avoided. Buses can carry larger loads without overheating.

The housing is made of Alcoa Aluminum sheet, riveted in sections in the shop and then bolted together on the job. It has three compartments, providing phase separation for the three Aluminum conductors. Each conductor is made up of two 6-inch Aluminum channels placed to form a hollow square, and the bus joints are welded.

Aluminum housings and buses are easily fabricated from standard structural materials. Aluminum construction is strong and neat, and needs no protective coating of paint. Its lighter weight places less burden on supports, thereby simplifying construction and often reducing costs. ALUMINUM COMPANY OF AMERICA, 2132 Gulf Building, Pittsburgh, Pa.

Reg. U.S. Pat. Off. ALCOA ALUMINUM

Air-Conditioned County Fair at Pomona

Probably the largest as well as the first "air conditioned" county fair display was that of Southern California Edison Co. at the Los Angeles County Fair, Pomona, which opened Sept. 18. A 10,000-cu. ft. per minute evaporative cooler with a plenum chamber over the top of the booth covered the 20 by 70-ft. space and blew cooled air down over the display space and out through vanes from the plenum chamber. Glass sides permitted a view of ribbons blown by the air currents to dramatize the action of the cooler.

Shown at this exhibit among the usual appliances and devices were two novelties. The first was a new design of electric range by Thermador, the other an ingenious means of displaying adequate wiring for the home. The new range answers complaints heard from the field that console type of range ovens are too low. In this the oven section is high and is reversible so that it can be placed either at the right hand or left hand side of the cooking surface. The service table can be had in 3, 4 or 6 units and the broiler unit is also separate. A variety of combinations is possible by assembling the units in different ways.

The Adequate Wiring display centered around a miniature house with a glass roof arranged according to a Woman's Home Companion prize plan. It was shown wired as in the plan with one outlet in each room, then as wired according to the Red Seal plan. Mounted on a board 6 ft. long, 4 ft. wide, it was tilted so that passers-by could view it looking down into the room. It was shown completely furnished with floor and table lamps equipped with tiny bulbs and parchment shades.

Special instructions were given the attendants to find out what did appeal to the public so as to guide future sales efforts. It was estimated over 50,000 people would see it and this type of consumer opinion should prove valuable in sales direction, said H. C. Rice, merchandise manager.

Oregon Power Figures Set All-time Record

Consumption of electric power in Oregon during 1939 set an all-time record of 1,349,474,260 kw.-hrs., an increase of 11.62 percent over 1938 and 7.79 percent over the previous high record in 1937, Public Utilities Commissioner Ormond R. Bean reported last month.

Gross revenues of the power companies were $22,189,107, a gain of $1,710,374 over 1938. The average revenue per kw.-hr. sold in 1939 was 1.63 cents, a reduction of .16 cent from the previous year. Residential and rural power sold for an average of 2.71 cents per kw.-hr., a drop of .05 of a cent from 1938.

The report showed that since 1930 total sales have increased 34.09 percent.

The residential revenue for 1939 exceeded that of 1938 by more than $500,000. This revenue, Bean said, has proved the most stable source of income to the electric utilities.

Oregon operating expenses and taxes for class A, B, and C electric utilities increased $983,195.80, or 7.44 percent during the year 1939. These taxes aggregated $3,601,078.40, an increase of 6.62 percent over 1938. This is 16 cents of every dollar of gross revenue collected and is $13.62 per customer.

The report said the year 1939 was marked by unusual activity in the field of rural electrification. Approximately 511 miles of rural line was built by the electric companies and 4,661 new rural customers were added.

Hydro-electric generation of electric energy decreased .61 percent from 1930.

Vallejo (Calif.) Street Lighting Costs Studied

A study of street lighting costs in Vallejo with a view to a possible reduction in the rate will be made by the California State Railroad Commission as a result of a hearing on operation costs of the Vallejo Electric Light and Power Co.

The hearing was conducted by Railroad Commissioner C. C. Baker. Reports were presented by Edward F. McNaughton, director of the public utilities department; Roy A. Wehe, gas and electric engineer, and Loren W. East, research engineer for the commission.

Representing the city were Mayor John Stewart and Commissioner of Public Works Frank Brew. Dr. E. J. Casper, president; Roy Bragg, manager, and Frank Powers, attorney, represented the Vallejo Electric Light and Power Co.

Stewart and Brew stressed the need for reduced rates so that street lighting facilities can be extended. Brew cited an approximate increase of 70 per cent in street lighting during the last four years despite the fact electric rates as a whole have been reduced.

● WHATCOM COUNTY PUD COMMISSIONERS in Bellingham, Wash., announce that they will purchase the holdings of the Puget Sound Power & Light Co.'s property in the district for $5,000,000, the value set by jury in the recent condemnation trial at Bellingham.

Edison's Electrical Times Wins National Award

Southern California Edison's consumer magazine *Electrical Times*, has won a national award in the 1940 Better Copy contest of the Public Utilities Advertising Assn. of the Advertising Federation of America. The recognition was made in the classification of bill enclosures to residential customers. Publications from electric utility companies from all over the United States were entered in the competition, which covered the year of 1939.

Electrical Times is published every month under the direction of R. G. Kenyon, advertising manager. It contains eight pages, 5½ x 8 in., and is sent to customers with their service statements. Live news of interesting uses of electricity is treated in a pictorial manner. Each issue contains a representative story from the domestic, farm, industrial, lighting, and commercial cooking fields.

FPC Report Shows Water Power Increases

Total installed capacity of water in plants of 100 hp. or more in the United States and outlying territories on Jan. 1, 1940, was 18,649,652 hp., according to a Federal Power Commission report. Total capacity of the United States was 18,500,254 hp., an increase of 551,348 hp. or 3.1%. Approximately 50% of this increase was due to construction of new plants. Arizona and Wyoming were among the five states that showed the largest increase. California with a total installed water-power capacity of 2,433,269 hp., representing 13.16% of the U. S. total, ranked first among the 48 states, with Washington third and Nevada, seventh.

Production of electric energy for public use during July, 1940, totaled 11,827,869,000 kw.-hr., according to another FPC report. This represented an increase of 12.8% when compared with the same month of the previous year. Average daily production was 381,544,000 kw.-hr., or 2% more than average production in June, 1940. Production by water power in July amounted to 4,144,915,000 kw.-hr. or 35% of the total output for public use.

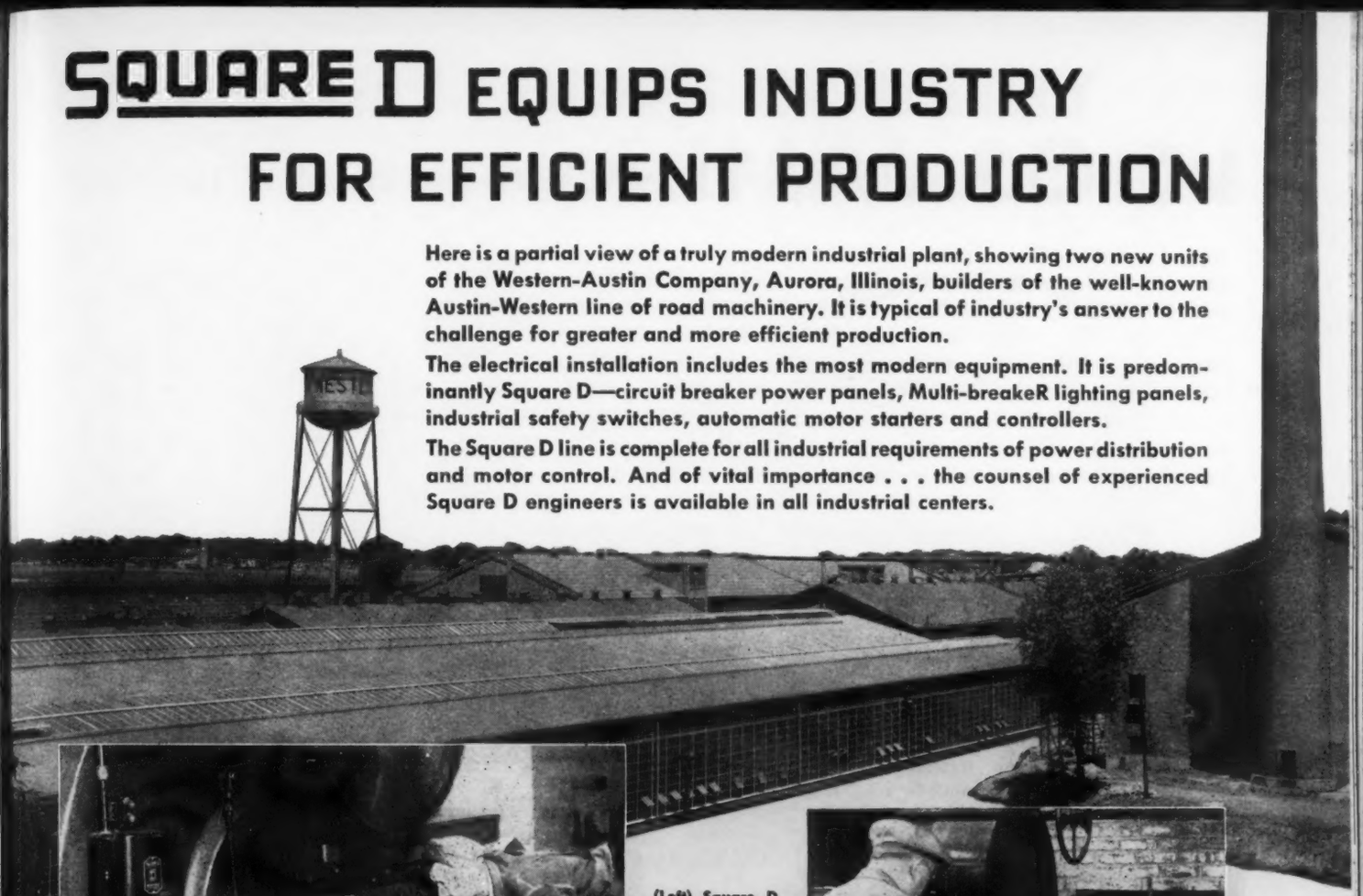
● THE DOUGLAS COUNTY REA PROJECT at Waterville, Wash., has received final approval, with $72,000 allocated for the job. The project will be named Douglas County Electric Cooperative, and will include 90 miles of line. There will be a substation at Waterville. Warner V. Friel, Douglas, is president.

SQUARE D EQUIPS INDUSTRY FOR EFFICIENT PRODUCTION

Here is a partial view of a truly modern industrial plant, showing two new units of the Western-Austin Company, Aurora, Illinois, builders of the well-known Austin-Western line of road machinery. It is typical of industry's answer to the challenge for greater and more efficient production.

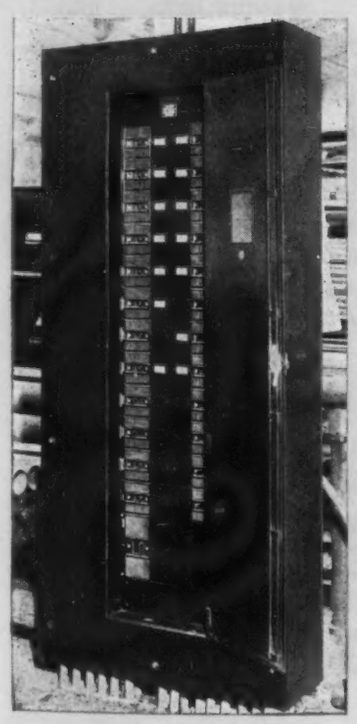
The electrical installation includes the most modern equipment. It is predominantly Square D—circuit breaker power panels, Multi-breakeR lighting panels, industrial safety switches, automatic motor starters and controllers.

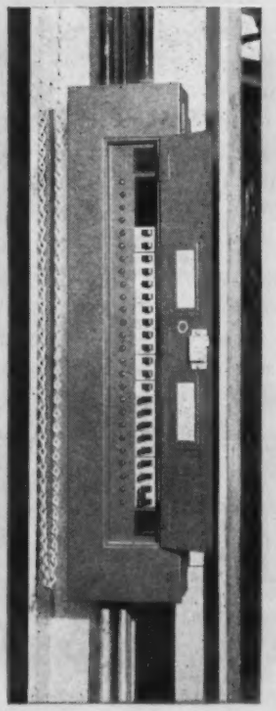
The Square D line is complete for all industrial requirements of power distribution and motor control. And of vital importance . . . the counsel of experienced Square D engineers is available in all industrial centers.



(Left) Square D automatic motor starters are used throughout the plant.

(Right) Square D 4-speed automatic controller on machine tool.

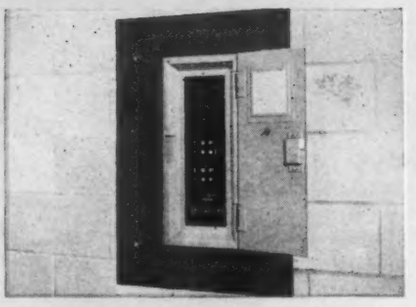




(Extreme left) Square D circuit breaker convertible power panel eliminates fuses in power circuits.

(Right) Square D Multi-breakeR lighting panel. There are no fuses in the lighting circuits throughout the plant.

(Left) Square D narrow type Multi-breakeR lighting panel mounted within column.



(Below) Square D heavy duty industrial safety switches. Front operation for gang mounting.

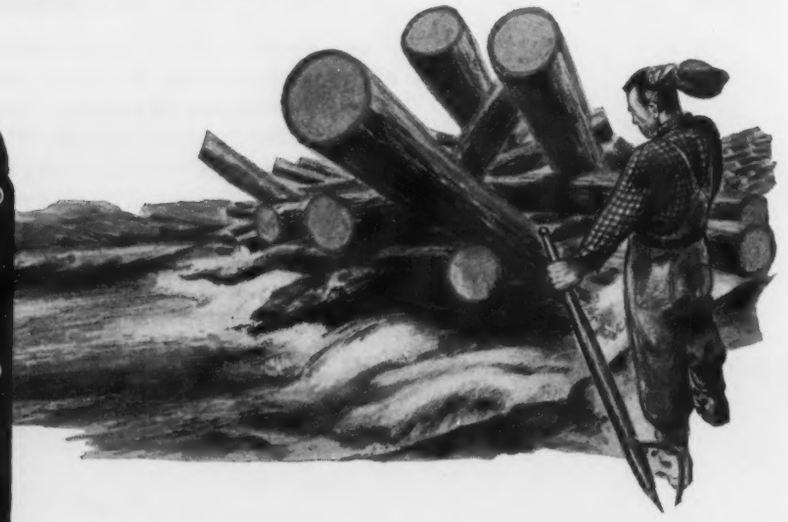
CALL IN A SQUARE D MAN

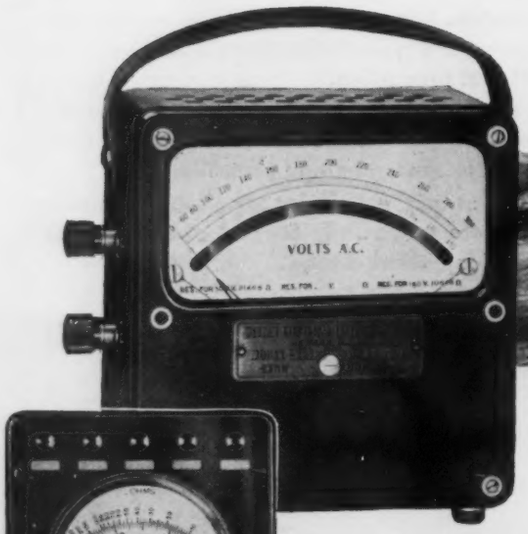
SQUARE D COMPANY

LOS ANGELES - MILWAUKEE - DETROIT

IN CANADA: SQUARE D COMPANY CANADA LIMITED, TORONTO, ONTARIO

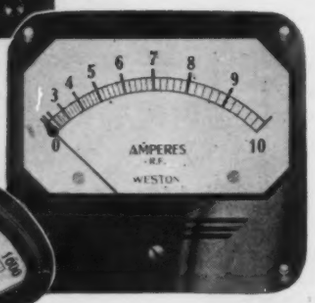
LOGS JAM! *WHEN THE STREAM IS LOADED*





WESTON portable instruments for quick, efficient maintenance testing.

WESTON portable multi-range instruments for production testing and inspection.



WESTON panel and switchboard instruments . . . all types, sizes and ranges required.

WESTON Electrical Tachometers — calibrated in R.P.M., feet-per-minute, or any desired units.

WESTON multi-range AC Clamp-Ammeter . . . for time saving current measurement...trouble shooting.

WITH WORK FLOW *"ON THE RISE"*

Industry forestalls production log-jams ...WITH WESTONS

Today, more than ever, the production stream must be kept flowing smoothly. Electrical circuits, motors and all electrified equipment must be maintained to operate steadily, efficiently ...without costly break-downs and work interruptions. The production and assembly of electrical units must be of uniformly high quality...to check costly rejects and other waste along production lines. And in the generation and distribution of electrical power, adequate control is essential to assure maximum efficiency with minimum waste.

Throughout industry today, in plants where the need for uninterrupted work flow is vital, WESTON instruments are *on the job;* forestalling maintenance troubles...safeguarding production operations and processes...providing smooth, efficient operations throughout, at lower costs. WESTONS invariably are assigned these important tasks because today's exacting needs call for instruments of unquestioned accuracy and long-time reliability...qualities which WESTONS supply in fullest measure.

Why not check with your local WESTON representative today, to make sure there are no potential "jam-points" in your production stream which might be kept "clear" with adequate instrumentation. His counsel is freely offered. Weston Electrical Instrument Corp., 577 Frelinghuysen Avenue, Newark, N. J.

Laboratory Standards . . . Precision DC and AC Portables . . . Instrument Transformers . . . Sensitive Relays . . . DC, AC, and Thermo Switchboard and Panel Instruments.

WESTON

Specialized Test Equipment . . . Light Measurement and Control Devices . . . Exposure Meters...Aircraft Instruments... Electric Tachometers...Dial Thermometers.

FOR OVER 52 YEARS LEADERS IN ELECTRICAL MEASURING INSTRUMENTS

WESTERN REPRESENTATIVES

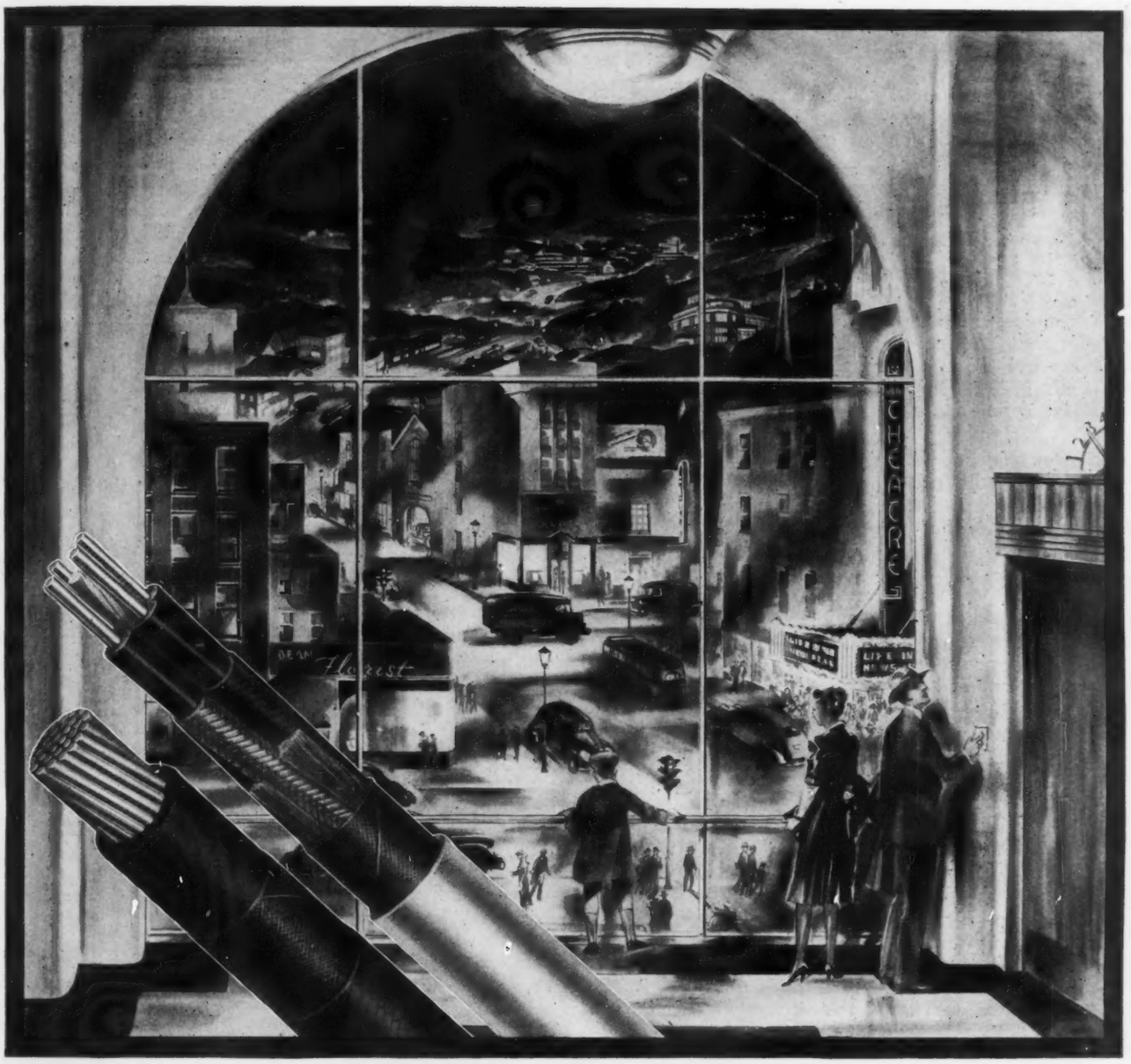
Seattle, Wash.
Eicher & Bratt,
263 Colman Bldg.

San Francisco, Calif.
Herman E. Held,
420 Market St.

Los Angeles, Calif.
A. A. Barbera,
Subway Terminal Bldg.

Denver, Colo.
J. W. Van De Grift,
623 Charles Bldg.

Phoenix, Ariz.
J. E. Redmond Co.,
448 W. Madison St.



Whereby a City Lives

Wires and cables beneath the streets, within the walls, a maze of cables everywhere. Through them surges the vital force whereby the city lives—giant power, all-pervading illumination, the flash of traffic lights, the rush of winging messages, or sudden fire alarm. For each service a product engineered to a particular job and manufactured with the responsibility of General Cable behind it.

GENERAL CABLE

GENERAL CABLE

BARE and INSULATED WIRES and CABLES for EVERY ELECTRICAL PURPOSE

General Cable Corporation Sales Offices: ATLANTA • BOSTON • BUFFALO • CHICAGO • CINCINNATI • CLEVELAND • DALLAS • DETROIT
KANSAS CITY (MO.) • LOS ANGELES • NEW YORK • PHILADELPHIA • PITTSBURGH • ROME (N.Y.) • ST. LOUIS • SAN FRANCISCO • SEATTLE • WASHINGTON (D.C.)

Ickes Awards Contracts For Parker Dam Project

Six contracts, totaling $351,110, were awarded recently by Secretary of the Interior Ickes, for furnishing power equipment for the Phoenix terminal substation and the Parker power plant, Parker Dam Power Project, Arizona-California.

The Kelman Electric & Mfg. Co., Los Angeles, was awarded the contract for furnishing eight 161,000-volt, 1,200 amp. three-pole, single-throw, outdoor-type oil circuit breakers complete with oil, on its bid of $214,849. One of these circuit breakers is for the Phoenix terminal substation, and the other seven for the Parker power plant.

Successful bidder for contract to supply five 69,000-volt, 600 amp., three-pole, single-throw, outdoor-type oil circuit breakers was the Westinghouse Electric and Mfg. Co. of Denver, on its bid of $48,514.

This company was also awarded the contract on its bid of $10,179 for six coupling capacitors and potential devices for supplying potential for synchroscopes, meters, and relays.

The Electric Power Equipment Corp., Philadelphia, was low bidder, at $46,606, for furnishing 58 disconnecting switches of the outdoor, triple-pole, manually-gang-operated, vertical-break or of the single-pole, hook-stick-operated type, all switches to be designed for mounting on steel structures.

Six 69,000-volt potential transformers, and one 69,000 to 115,000-volt potential transformer will be supplied by the Allis-Chalmers Mfg. Co. of Milwaukee, on its bid of $12,920. All seven transformers shall be of the oil-immersed type, suitable for operation at 60 cycles, each transformer to have a capacity of not less than 550 volt-amperes.

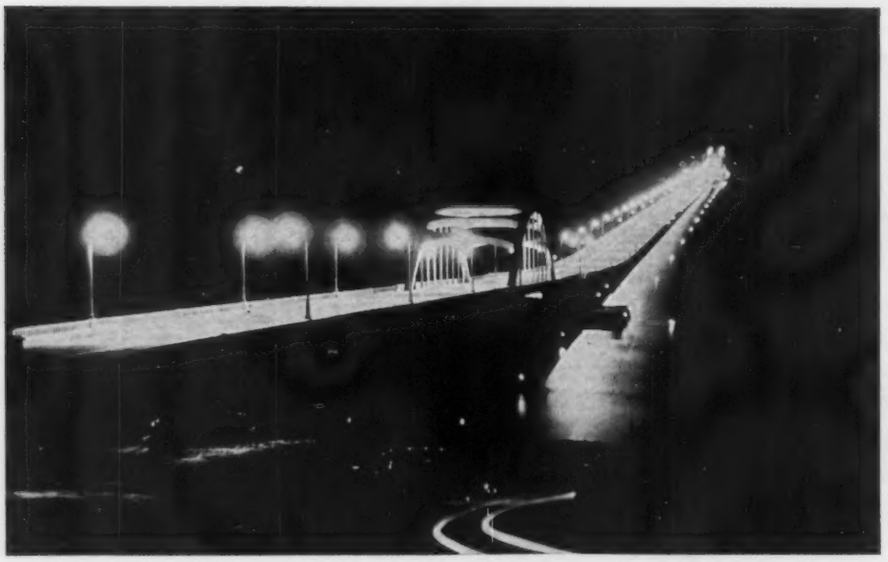
The General Electric Co. of Schenectady was the successful bidder for supplying 7 lighting arresters of the thyrite or autovalve, station type suitable for outdoor use on 3-phase, 60-cycle circuits. Its bid was for $18,042.

Boulder Dam Contract to General Electric

Secretary of the Interior Harold L. Ickes awarded a contract for an 82,500-kva. generator for Unit A-5. This is the eleventh generating unit to be ordered for the Boulder Dam power plant. Successful bid of $700,000 was submitted by General Electric Co.

Contract covers the furnishing and installing of one 82,500-kva. generator for Unit A-5 to be installed in the Arizona wing of the U-shaped powerhouse. The 115,000 h.p. pressure regulator and governor for this unit were ordered under contracts awarded last month. The new unit will be used by the Southern California Edison Co.

● INCREASED DEMAND for electricity at the Sacred Heart hospital in Spokane resulted in the replacement of the last large electric plant in Spokane to be operated by steam with electric current from the lines of the Washington Water Power Co., according to Lewis A. Lewis, assistant general manager and manager of the Spokane division. The hospital was faced with the necessity of either enlarging its boiler rooms or buying more current, and chose the latter.



A NIGHT VIEW of the world's longest floating bridge recently opened to traffic across Lake Washington on U. S. Highway 10 near Seattle. The mile-and-a-quarter long span is lighted with sodium luminaires developed by General Electric engineers. White spots in water are floating lights

Los Angeles Generator to Be Built by Westinghouse

A contract to build a 65,000 kw. turbine generator has just been awarded the Westinghouse Electric & Mfg. Co. by the City of Los Angeles. The unit, to be installed in the Wilmington Station costing over one million dollars, will be the largest 36000 rpm. condensing turbine that has been built. Steam conditions are 850 lb. per square in., 900 deg. F. and 29 in. Hg. vacuum.

The turbine will provide firm reserve power for the electricity received from the hydroelectric development at Boulder Dam. It will normally carry a load of 5000 kw., being ready at any instant to pick up and carry a full load of 65,000 kw. should there be any outage along the Boulder Dam line.

The unit which has a maximum rating of 75,000 kw., weighs over 500 tons, and has a blade tip speed of approximately 850 mi. per hour. It will be placed in service in 1942.

● GRAYS HARBOR PUD COMMISSIONERS, Aberdeen, Wash., plan erection of a new $32,000 headquarters building at Electric Park. Structure will be of concrete, attached to the present power plant building at the Park.

Contracts Awarded

TO THE OTIS ELEVATOR CO., San Francisco, for furnishing elevators and control equipment for the Grand Coulee Dam and power plant, $187,352. Contract covers the furnishing and installation of 4 electrically operated elevators, with operating machinery and control equipment, and 8 elevator hoistway-door units for elevator landings. Two of the elevators are for the hoistways or shafts in the dam and two for those in the powerhouse.

TO UTAH CONSTRUCTION CO., for construction of a 116,000 volt, high-tension transmission line from Grace, Idaho, Utah Power & Light power plant to Montana Power Co. power plant at Anaconda, $2,500,000.

TO WASHINGTON ASPHALT CO., Seattle, for construction of 203.5 mi. of line for the Chehalis PUD (Wash.) No. 1., $163,288.

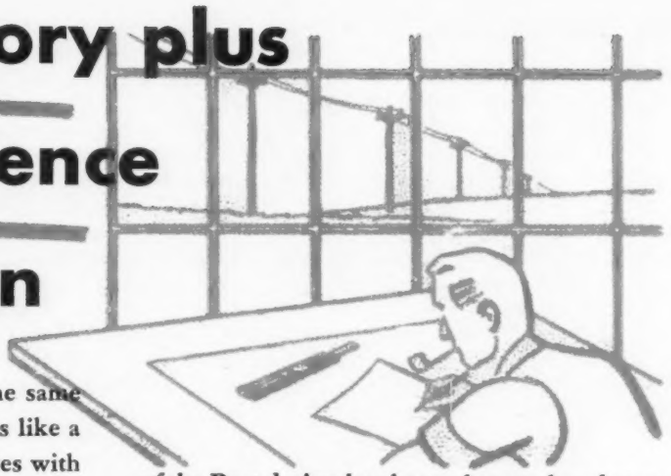
TO H. A. RISK PIPE & CONSTRUCTION CO., Nebraska City, Nebr. for building 101 mi. of line for the Raft River Rural Electric Coop., Inc., Malta, Idaho.

TO HOMER G. JOHNSON, Portland, to build rural electric lines into Asotin County, Wash. by the Clearwater Valley Light & Power Assn., $53,722.

TO J. J. ACUTTER & CO., Seattle, a contract from the Navy Department for improvement of the fire-protection system at the Naval Ammunition Depot on Puget Sound, $85,618.

TO CITY ELECTRIC, Nampa, Idaho, bidding $101,946 to the Columbia Rural Electrification Assn., Dayton, Wash., for the construction of 219 mi. of REA transmission lines in Walla Walla County.

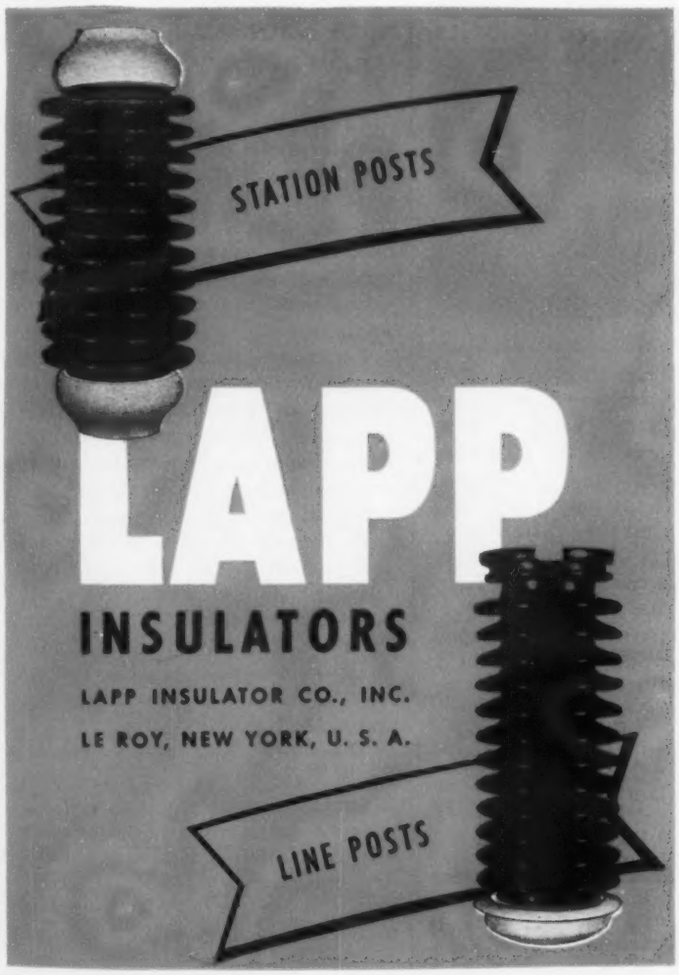
Engineering theory plus practical experience prove this design



For nine years, some engineers have been telling us the same story, "Your Line Post and Station Post design looks like a world-beater on paper. But we've had sad experiences with tricky new stuff. We'll see how it works out before we risk our conductor on it."

Now the Line Post is nine years old. We've put Posts up where no other insulator would stand the gaff. We've had ten-pole "trial sections" stuck in the middle of long lines. We've sold Post insulators for stations and transmission lines from New England to Los Angeles.

And every claim we ever made for the operating performance of the Post design has been eloquently substantiated in the rough-and-tumble of heat and cold, sleet and lightning, dirt and fog. With nothing about them to deteriorate, there's no reason to believe that the Post insulators now in service won't last until the last pole has rotted out from under them.



Every situation under which conventional insulators fail has been encountered by Lapp Post units. And we've yet to hear of the installation in which the Line Posts or Station Posts did not give more satisfactory service than the conventional units which they replaced.

Claims which we have made for our Post design —claims which we are prepared to prove on a sound engineering basis, or from case histories of actual installations—include the following: *Absolute and permanent elimination of insulator-caused radio interference, superior ability to withstand power arcover and mechanical attack from stones and bullets, freedom from puncture and cracking, almost complete elimination of cleaning, and superior performance under fog and dirt conditions, greater rigidity, fewer insulator failures and replacements.*

Can your company afford to wait longer to start enjoying benefits of Lapp Line Posts and Station Posts?

the proved design for better operating performance

REA Statistics Show Large Rural Increases

Almost 2,000,000 farms, or 29 per cent of the farms in the United States, enjoy the advantages of high-line electric service, according to Harry Slattery, REA Administrator. This is well over 2½ times the number of farms—743,954 or 10.9 per cent—having such service shortly before the REA was established in 1935.

Of 727 REA borrowers, approximately 630 have all or part of their distribution systems in operation, with 233,000 miles of line energized, in 45 States.

To achieve this rapid expansion in service, construction progressed at nearly 400 miles of line per working day during the first 6 months of 1940, reaching 500 miles and more.

Total allotments for electrification stood at $294,000,000 on July 31, 1940, including allotments totaling $6,000,000 for wiring and plumbing installation. About $80,000,000 still remains to be allotted from 1940-41 funds.

● CLARKSTON, WASH. plans the installation of a street lighting system, to include twenty-three 6,000-lumen lights on Sixth between Chestnut and Maple Street at a cost of $2,600.

MOON LAKE ELECTRIC ASSN., Mt. Emmons, Utah, has been allotted $128,000 to build 148 mi. of line to serve Duchesne and Uintah Counties and $12,000 for wiring. E. D. Conklin is supt. of this power system.

NORTHEAST CLACKAMAS COUNTY ELECTRIC COOP., INC., Sandy Ore., has been awarded $46,000 to build 60 mi. of line in Clackamas County.

HOLY CROSS ELECTRIC ASSN., Eagle, Colo. has been awarded $119,000 to build 115 mi. of line in Eagle, Garfield, and Pitkin Counties.

BENTON-LINCOLN ELECTRIC COOP., INC., Corvallis, Ore. has been allotted $285,000 to build 260 mi. of line in Benton, Lincoln, and Polk Counties. Guy Thomas is supt. of this system.

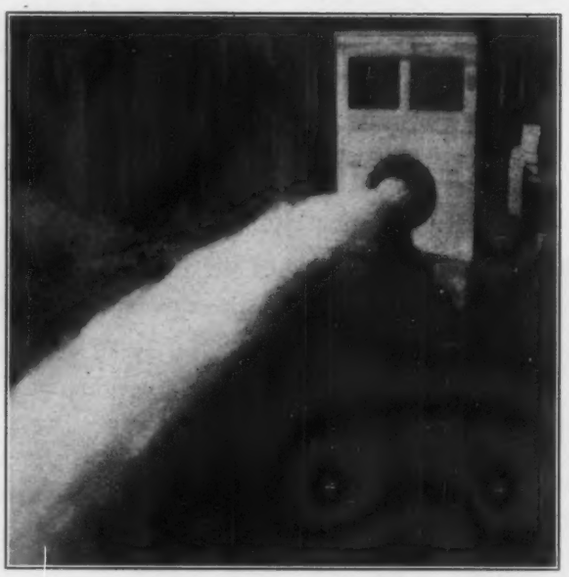
RIVERTON VALLEY ELECTRIC ASSN., Riverton, Wyo., has been awarded $86,000 to build 110 mi. of line in Fremont County.

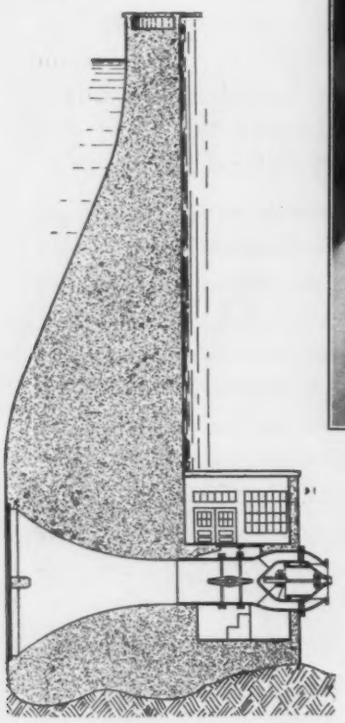
CENTRAL VALLEY ELECTRIC COOP., INC., Artesia, N. M. has been awarded $15,000 for irrigation equipment, and $2,000 for wiring.

MALHEUR COOPERATIVE ELECTRIC ASSN., Vale, Ore., has been allotted $10,000 for wiring.

CENTRAL ELECTRIC COOP., INC., Redmond, Ore, has been awarded $6,000 for wiring.

For Flood Control . . . Regulation of Stream Flow





Typical arch type dam section showing arrangement of conduit, butterfly valve and discharge regulator.

Pelton designed regulators of the Johnson (balanced plunger) type are utilized in most of the West's large scale water conservation, flood control and stream flow regulation developments, and have met the most exacting requirements of this service. They are smooth in operation at all openings and are easily manipulated through pilot valve control, of the main plunger. Units of this type have been built up to 10 ft. discharge opening, capable of 5800 c.f.s. under 250 ft. head.

The Pelton Water Wheel Company
HYDRAULIC ENGINEERS

120 Broadway NEW YORK
2919 Nineteenth St. SAN FRANCISCO
Paschall Station PHILADELPHIA

BLW THE BALDWIN GROUP
PELTON
Subsidiary of THE BALDWIN LOCOMOTIVE WORKS

TRADE NOTES

Former Utah Power Salesmen Open Salt Lake Store

Salt Lake City's newest electrical appliance store, the Intermountain Utilities Appliance Co., was officially opened recently and the thirteen former members of the Utah Power & Light Co.'s residential sales personnel are continuing the sale of electric appliances to Salt Lake City residents in much the same manner as they were before the utility gave up merchandising major appliances.

Large advertisements in Salt Lake City newspapers announced the official opening and introduced the officials and personnel. W. I. Terry is president; O. Reid Bigelow, vice-president and general manager. R. M. Willardsen is secretary. All are well known in Salt Lake City, having been for many years top salesmen in the power company's Salt Lake Division. Other salesmen, all former utility men, are M. L. Miller, A. C. Patterson, H. R. Clinger, H. P. Monson, D. R. Featherstone, C. F. Packard, W. Neeley, S. C. Nabaum, S. H. Bigelow and G. A. Rowsell.

The store itself is located at 331 South Main Street. Large floor displays feature the complete Hotpoint line of ranges, refrigerators, water heaters, kitchen sanitation equipment and laundry equipment. In addition complete stocks of electric table appliances, RCA radios, and Winkler and Sentinel stokers are handled.

● RADIOS AND APPLIANCES will be major items of stock at the new John Breuner store to be opened Nov. 15, at Vallejo, Calif., the sixth store of the line. Ernest Staats will manage the new store occupying the Bedford Furniture Co. Bldg.

● LYON RURAL ELECTRIC CO. is the new name of what has been known as the Lyon Electric Brooder Co. of San Diego, manufacturers of farm electrical equipment for many years. Starting with electric brooders, the company has expanded the manufacture of other allied rural electric products.

● THE STUSSER ELECTRIC CO., wholesale electric supplies, Seattle, leased a two story building at Fourth avenue and James street and occupied the new quarters Oct. 1. The firm, recently appointed a distributor of General Electric appliances, has been in business in Seattle for 21 years.

● HOWARD HARDWARE CO., Paonia, Colo. has opened an electrical dept. They will stock General Electric ranges, refrigerators, washers and small appliances and Thor ironers.

● TRUMAN W. BALL, formerly manager of appliance sales for the Storz Supply Co., Omaha, Nebraska, is now field representative for The Bryant Electric Co. in northern California and Nevada. He was at one time with the Iowa-Nebraska Power Co. after studying electrical engineering at the Univ. of Nebraska.

● CUTLER-HAMMER INC., San Francisco, have moved to 711 Potrero, where sales and engineering offices and plant will be at one location. At present, the sales warehouse is separated from the factory at 970 Folsom St. The sales warehouse will be moved to the new location from 1039 Harrison St.

● CALIFORNIA ELECTRIC CONSTRUCTION CO. has been appointed as authorized service station for northern California, effective Sept. 1, for the following lines: Everhot Appliances, manufactured by the Swartzbough Mfg. Co.; and the Waring Blendor, manufactured by the Waring Mixer Corp.

● THE UTAH VALLEY ELECTRIC CO., newest Provo appliance dealer, is under the management of two former Utah Power & Light (Provo division) salesmen, Charles D. Sessions and Ernest Salerno. The new store will handle a complete line of Westinghouse appliances, stokers, Zenith radios, Graybar sewing machines and automatic washers.

KWIKON Set Screw "E.M.T." Fittings are

Truly Economical

Because you pay less for them* —and because you install them faster and easier — Kwikon Set Screw "E.M.T." Fittings effect savings for you right down through the finished job. That is true economy.

***Ask your jobber about the new, low prices!**

Approved by Underwriters' Laboratories, Inc.

KWIKON CO. 626 W. JACKSON CHICAGO, ILLINOIS

Here You Are

Constructed From Fine Sheet Steel **. . . making stronger, neater and more durable connections than ever. Impossible to split the tube end because of inbuilt tensile strength of the sheet steel.**

Larger Shoulder **. . . completely closing the knockout hole in the box.**

New, Improved Bending-Type Lock Nut.

No Open Seam **. . . Lap seam construction makes all connections smooth and finished.**

NO INCREASE OVER PRESENT LOW PRICES

½" size available October 15th, other sizes available soon.

The NEW
BRIEGEL METHOD CONNECTOR

Patents Pending
Approved by Underwriters Laboratories

Distributed By:

The M. B. Austin Co., Chicago, Ill.	Clifton Conduit Co., Jersey City, N. J.	The Steelduct Co., Youngstown, Ohio	National Enameling & Mfg. Co. Pittsburgh, Pa.
Clayton Mark & Co. Evanston, Ill.	General Electric Co., Bridgeport, Conn.	Enameled Metals Co., Pittsburgh, Pa.	Triangle Conduit & Cable Co. Elmhurst, New York City

BRIEGEL METHOD TOOL CO., Galva, Illinois

● THE INLAND EMPIRE ELECTRIC EQUIPMENT Assn. recently held a meeting in Spokane to hear E. D. Stryker, sales promotion manager of General Electric Co., Cleveland. Stryker outlined an all-industry light conditioning program to more than 200 dealers and salesmen. R. C. Nelson, manager of the Palace store, as president of the association, was in charge of the meeting. He was assisted by A. H. Wegner, secretary, and sales manager of the Spokane division, Washington Water Power Co.

● EMER OSTLER has been appointed supervisor of appliance sales for Royle Radio & Appliance Co. at Provo, Utah, according to E. M. Royle, manager of the Provo and Sugar House stores.

● FRANK H. BRAN CO., manufacturers' agent, moved its main office from San Francisco to Los Angeles Oct. 1. where it is located at 1312 South Los Angeles street. Mr. Bran stated that northern California. the Pacific Northwest, and the Hawaiian Islands would continue to be served from the San Francisco warehouse, 894 Folsom street. This move will not affect the lines carried, which include Kwikon Co., Northern Incandescent Lamp Co., Columbia Cable & Electric Co., and others.

● L. J. SPEIGHT LTD. are now established in their larger new premises at 1043 Granville street, Vancouver, across the street from their old location. The firm was launched a number of years ago as a radio store by L. J. Speight. Later electrical appliances were added. and a few years ago furniture was also included in the merchandise handled.

● THE TRUMBULL ELECTRIC MFG. CO. had an open house at their new factory at 810 East Third Street, Los Angeles, on Sept. 20.

● THE MARKET EQUIPMENT INDUSTRY will be represented in the 16th Annual Food and Home Appliance Exposition to be held Oct. 26-Nov. 3 in Los Angeles.

● SAN DIEGO CONSOLIDATED GAS & ELECTRIC CO. is now known as the San Diego Gas & Electric Co. after an official name change which became effective Oct. 1.

Moved

California Electric Co., Oakland, from 12th & Oak Sts. to 3015 Adeline street.

Lowenthal Electric Co., Pueblo, Colo., from 1077 Broadway to 215 N. Union street.

Superior Pole Treating Co., Chas. F. Stove, manager, from Marion Bldg., Seattle, to 7400 8th Ave. So.

ABOUT PEOPLE

Reed Heads G-E Visitors, Talks About Defense

"If we do it right, just as sure as we're sitting here, the national income is going to go up far and go up fast."

Thus spoke Philip D. Reed, 40-year-old G-E board chairman, most colorful and most authoritative of a trio of G-E executives who were, independently, touring the West last month.

The others were: D. C. Prince, manager of the commercial engineering de-

REED

partments. His is a new job, and among other things he heads up the liaison between customer and manufacturer, through which customer's needs are translated into new designs.

And Laurence A. Hawkins, executive engineer of the research laboratories, who addressed electrical groups on research in peace and in war, telling how G-E's present shift in research is toward military developments.

Reed's comments on national income were made at a press conference and were coupled with the warning that all national factors point toward the typical inflationary boom with lowered production going hand in hand, unless intelligent controls are brought to bear.

Reed was making his first tour of the West and said he saw here great opportunities by virtue of the region's natural wealth.

"I don't know whether we're talking about 5 years hence, or 10, or 20, but expansion of the area is bound to come."

As to defense, Reed said the importance of industrial conscription has been enormously exaggerated. He feels success rests in a joint industry-government effort embodying: (1) great tact and patience; (2) establishment by industry (without government hindrance) of adequate financial reserve; (3) industrial training of individuals; (4) the avoidance of priority seeking.

Reed feels great industrial activity can safely be predicted, because it rests on re-armament, which can be appreciably affected only by the unlikely event of a Hitler collapse.

G-E's defense work he outlined in a talk before San Francisco chamber of commerce as follows:

"For the Navy: gun mounts and projectile hoists for anti-aircraft weapons; electric drives for submarines; turbines for ship propulsion, delivering in some cases more than 50,000 hp. each; reduction gears up to 18 ft. in diameter, weighing as much as 70,000 lb., and machined to tolerances measured in ten-thousandths of an inch, through which these turbines are connected to the propellor shafts; electric and hydraulic devices for maintaining naval guns and searchlights at the desired position regardless of sea conditions; searchlights for anti-aircraft and other purposes; radio transmitting and receiving apparatus.

"For the Army: 75mm howitzers; a new electric drive for tanks; anti-aircraft lighting systems; radio transmitters and receivers; 60-in. searchlights delivering an 800-million candlepower beam from which a newspaper can be read 12 mi. away.

"For the Air Forces: turbo-superchargers which maintain airplane engine efficiency at high altitudes and provide normal pressure in sealed cabins. These minature turbines are driven by the exhaust from the engine and operate red-hot at more than 20,000 rpm.; electric generators having two to three times the output of previous designs and delivering one kilowatt per pound of weight; propeller pitch control devices; gun control equipment; radio transmitters and receivers.

"In addition," he said, "we furnish a long list of general items, including wire and cable, Selsyns, motors, lamps, switch-gear, control instruments, etc. For the British government we are making aircraft starter motors, magnetos and gear-type superchargers."

Reed declared that "American industry neither profits by nor under any circumstances desires war" and that industry would be "well satisfied" to complete the defense program "with no other assurances than that it shall not emerge with a net loss on the material produced or the investment.

● TOM INGLEMAN, formerly of The Incandescent Supply Co., has joined Graybar in San Francisco and will cover territory in the East Bay. Preston Hopkins, illuminating engineer and fixture designer, has also become a member of the Graybar staff and will handle the San Francisco territory.

● P. O. WESTON, former manager of the Rockbestos St. Louis sales office, who has been put in charge of the new Pacific Coast sales office, is located with the company's Pacific Coast sales agent, Marwood, Ltd., in San Francisco.

● ROBERT LINDERMAN, managing director of Mole-Richardson England, Ltd., spoke recently at an Electrical Estimator's luncheon in Los Angeles. He was formerly employed in Los Angeles with a local lamp company there.

● CHARLES P. JOHNSON, Westinghouse publicity division, Bloomfield, N. J. is now operating from headquarters in San Francisco, and is organizing a new publicity department in the 11 Western States, Alaska and Hawaii.

● E. W. WISNER, senior electrical engineer, Division of Architecture, State of California, was the author of the article in the September issue of Electrical West, "Finger Print Eye Comfort."

● LEONARD O. FRYER, former sales manager, Graybar Electric, San Francisco, has been assigned to the general staff at New York headquarters. He had been in the western office for 15 years.

● J. A. BULLOCK, general manager, the Western Colorado Power Co. has been designated by Governor Ralph L. Carr of Colorado as a member of the Colorado delegation to the 3rd annual conference of the National Tax Assn. held in New York recently.

● DELAMAR HOLT, sales manager, The Western Colorado Power Co. was recently elected president of the Montrose Lions' Club.

● FRANK M. MOSS, General Electric Co., Nela Park, Cleveland, will be the chief speaker on the evening program of the Sight Conservation Council of Northern California meeting to be held at the International House, Berkeley, Calif. on Oct. 25. The session will be held jointly with the Northern California Council for Exceptional Children.

● E. R. GOOLD, son of Rollin Goold, has been placed in charge of the merchandise store of Eddy Electric & Mechanical Co., Stockton, Calif., since Rollin Goold purchased the interest of Eddy Supplick in the business. Goold senior handles the electrical contracting end of the business which he is expanding to include general contracting.

● LAURENCE A. HAWKINS, executive engineer, General Electric Research Laboratory, recently addressed members of the Utah section, AIEE, Salt Lake City. Hawkins has been with General Electric since 1912.

● MONROE B. DAVID, New York City, director of the Light Conditioning Sales Service, was a recent speaker at a joint meeting of salesmen, jobbers, and other members of the electrical industry in Salt Lake City.

● HOWARD S. ENGLE, veteran member of the electrical industry, has recently become associated with The Triangle Conduit & Cable Co., Inc. He was with Allied Industries for many years.

● J. V. GONGWER, formerly connected with construction of the first and second Cushman dams of the Tacoma, Wash., municipal light department project, has returned to the department as chief construction engineer. Gongwer will make a survey of the possibilities of the city obtaining additional power, which local industries will need in the near future. The survey will include a comparison of costs of purchasing the power with costs of producing it possibly with addition of another hydroelectric plant.

CALIFORNIACS is the name this group of transplanted Californians with electrical interests call themselves. They met Sept. 19 at the Union League Club in New York. Top down and reading left to right they are: (a) Dr. Paul M. Cadman, American Bankers Assn.; John Busey, president, G-E Supply Corp.; G. Ross Henniger, editor, Electrical Engineering; Axel Kahn, Chicago district manager, G-E Supply Corp. (b) Ray Rich, sales manager, G-E water heater section; David Baker, and C. J. White, president, Tork Clock Co. (c) Park Lamborn, asst. purchasing agent, Kennecott Copper Corp.; Dan Harrington, manufacturers' representative. (d) Geo. C. Tenney, editor, Electrical West; A. H. Nicoll, vice-president, Graybar Electric Co.; Guy Barker, manager electrical insulation department, Johns-Manville Sales Corp. (e) Ely C. Hutchinson, Hunter Mfg. Corp.; E. O. Shreve, vice-president, General Electric Co.; Ben M. Tassie, president, Manning-Bowman & Co.

● FRANK MCLAUGHLIN, president Puget Sound Power & Light Co., for the eighth consecutive year has been appointed Washington State Chairman for Navy Day Oct. 27.

GEO. E. HONN CO.
420 Market St. San Francisco, Calif.
Manufacturers' Representative for
PYREX INSULATORS
S & C PROTECTIVE DEVICES
CORNELL-DUBILIER CAPACITORS
KELLEMS CABLE GRIPS
BLACKBURN CONNECTORS
COLUMBIA TONG TEST AMMETERS
—LOW VOLTAGE GENERATORS
BARTLETT TREE TRIMMING EQUIPMENT
METER JEWELS

● ELIAS STRONG, manager of the Electrical League of Utah, and a member of Western division board of International Assn. of Electrical Leagues, will attend the 5th Annual Conference of the association at Chicago, Nov. 13-14.

● C. A. MEIER, formerly Pacific Coast District Manager, Westinghouse Elec. & Mfg. Co., becomes manager of utility sales in that district and will continue to maintain his headquarters in San Francisco.

● STAN HARRISON, Westinghouse Elec. & Mfg. Co., Seattle, has been promoted to the San Francisco office, where he will head a new group in the Industrial Re-Sale Equipment Dept.

● GEORGE H. CARD, formerly lighting salesman with Portland General Electric, is now with Montgomery Electric Co., Portland, in a similar capacity.

● C. E. KIRKPATRICK, formerly sales manager for Graybar in Salt Lake City, has been transferred to the San Francisco Graybar office and is in charge of lamp and lighting sales there.

● HAROLD M. DENNY has been advanced to the sales managership of the Pacific Northwest territory for the Okonite Co. He served under J. C. Bird, former manager who has resigned, for four years as an outside salesman before his promotion.

● MRS. BARBARA DUNCAN, a former economist for the Utah Power & Light Co. has been added to the staff of the W. H. Bintz Co., Salt Lake City, intermountain distributors for electrical appliances. She will conduct cooking schools throughout the company's territory and will work directly with dealers.

● LLOYD D. COLVIN, formerly engineer with the Jacuzzi Pump Co., Berkeley, Calif., and more recently in the San Francisco plans and estimating dept., Pacific Gas and Electric Co., has been granted a year's leave of absence to serve as 1st Lieutenant, Signal Corps, U. S. Army, stationed in the Radio Division, Ninth Corps Area Headquarters, Presidio of San Francisco, San Francisco, California.

STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., required by the Acts of Congress of August 24, 1912, and March 3, 1933, of Electrical West, published monthly at San Francisco, Calif., October 1, 1940.

State of California, } ss.
County of San Francisco }

Before me, a notary in and for the state and county aforesaid, personally appeared Roy N. Phelan, who having been duly sworn according to law, deposes and says that he is the Business Manager of Electrical West, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation), etc. ,of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in section 411, Postal Laws and Regulations, printed on the reverse of this form, to-wit:

1. That the names and addresses of the publisher, editor, managing editor and business manager are:
Publisher, McGraw-Hill Company of California.....68 Post St., San Francisco, Calif.
Editor, George C. Tenney.....68 Post St., San Francisco, Calif.
Managing Editor .....None
Business Manager.....Roy N. Phelan, 68 Post St., San Francisco, Calif.

2. That the owners are: Give names and addresses of individual owners, or, if a corporation, give its name and the names and addresses of stockholders owning or holding 1 per cent or more of the total amount of stock.
McGraw-Hill Company of California, San Francisco, Calif.; McGraw-Hill Publishing Company, Inc., New York City; James H. McGraw, New York City; Howard Ehrlich, New York City; R. A. Balzari, San Francisco, Calif.; N. A. Bowers, San Francisco, Calif.; George C. Tenney, San Francisco, Calif.; John W. Otterson, San Francisco, Calif.

3. That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amounts of bonds, mortgages, or other securities are: None.

ROY N. PHELAN, Business Manager.

Sworn to and subscribed before me this 26th day of September, 1940.
(SEAL) W. E. SCHORD,
(My commission expires March 22, 1942)

Deaths

● J. RICHARD RYAN, for many years a resident of the East Bay district, died Aug. 29. Mr. Ryan was appliance sales manager for the G-E Supply Corp. in Los Angeles for 10 years before joining the F. J. Airey Co., Los Angeles, as vice-president two years ago.

● WALTER H. TRASK, JR., 57, died early last month in Salt Lake City after a several weeks' illness. Mr. Trask, a mechanical engineer, was at one time associated with the Idaho Power Company, and more recently with the Riter Engineering Company, Salt Lake City.

● ELI FOURNESS, 79, president of the Washington Water & Light Co., and resident in the Broderick Bryte district of Yolo County for 75 years, died recently.

● PAUL H. ROBBINS, electrical contractor of Shelton, Wash., died in that city recently. Mr. Robbins was born in Kinsley, Pa. He established his electrical firm in Shelton in 1929.

Stocks at San Francisco
Electrical Specialty Co., Inc.,
316 Eleventh Street

Stocks at Los Angeles
Electrical Specialty Co. of So. Calif.,
451 South San Pedro Street

Stocks at Seattle
Electrical Specialty Co., Inc.,
714 Fourth Avenue

For the Coast Trade
At your doorstep you now have an adequate stock of popular D-H alloys, wires, ribbons, rods and other forms.
Driver-Harris Company
Harrison, N. J.

TRADE MARK REG. U.S. PAT. OFF.
Nichrome

REDUCED MAINTENANCE

ON COMMUTATING EQUIPMENT

with

NATIONAL

TRADE-MARK

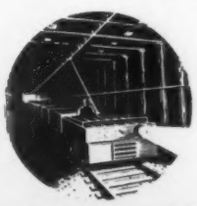
CARBON BRUSHES

● Minimum maintenance expense on commutating equipment is obtained by selecting brush grades having properties adapted to machine characteristics and service conditions.

"National" Carbon Brushes provide a well balanced assortment of grades: carbon, graphite, electro-graphitic and metal-graphite. There is a grade of "National" brushes for every type of machine and all classes of service. Our conveniently located representatives will gladly co-operate with you in effecting reduced maintenance expense through the selection of "National" grades specifically adapted to your equipment and service.

WRITE or WIRE to our nearest Branch Sales Office.

To offset the effects of vibration specify **RESILIENT PRESSURE PADS** on holder end of brushes.



UNIT OF UNION CARBIDE AND CARBON CORPORATION

UCC

NATIONAL CARBON COMPANY, INC.

CARBON SALES DIVISION . . CLEVELAND, OHIO

GENERAL OFFICES: 30 East 42nd Street, New York, N. Y.

BRANCH SALES OFFICES
NEW YORK
PITTSBURGH
CHICAGO
ST. LOUIS
SAN FRANCISCO

Index to Advertisers

October, 1940

Allis-Chalmers Mfg. Co. 3, 6, 7
Aluminum Company of America 77
American Steel & Wire Co. 25
Anaconda Wire & Cable Co. 75

Briegel Method Tool Co. 85

California Oregon Power Co. 36, 37
Chance Co., A. B. 12
Chicago Flexible Shaft Co. 4
Classified Section 24
Columbia Steel Co. 25
Corning Glass Works 73
Crescent Ins. Wire & Cable Co. 8
Crocker First National Bank 10

Driver-Harris Co. 88

Electrical Testing Labs. 24
Everstick Anchor Co. 10

Fast & Co., John E. 76

Gardner Elec. Mfg. Co. 16
G. C. A. Mfg. Co. 24
General Cable Corp. 81
General Electric Co., Bridgeport ... 23, 28
General Electric Co., Nela Park 69
General Electric Co., Schenectady ... 1
Graybar Electric Co., Inc. 9

Hazard Ins. Wire Works 11
Honn Co., Geo. E. 88

Idaho Power Company 36, 37
Ideal Commutator Dresser Co. 4
Indiana Steel & Wire Co. 4

Jeffries Transformer Co. 22

Kearney Corp., James R. 15
Kwikon Company 85

Lapp Insulator Co., Inc. 83
Line Material Company 71

Montana Power Company 36, 37

National Carbon Co., Inc. 89
National Tel. Supply Co., The 16

Okonite Company, The 11
Okonite-Callender Cable Co., The ... 11

Pacific Coast Elec'l Bureau .... 4th Cover
Pacific Electric Mfg. Corp. 67
Pacific Gas and Electric Co. ... 3rd Cover
Pelton Water Wheel Co. 84
Penn-Union Electric Corp. 24
Portland General Electric Co. 36, 37
Publisher's Statement 88
Puget Sound Power & Light Co. ... 36, 37

Reliable Electric Co. 20
Rockbestos Products Corp. 13
Roebling's Sons Co., John A. 65

Schweitzer & Conrad, Inc. 5
Shell Oil Company 21
Sherman Mfg. Co., H. B. 14
Southern California Edison Co. Ltd. ..... 2nd Cover
Square D Company 79

Tork Clock Co., The 24

Union Carbide and Carbon Corp. 89
United States Steel Corp. 25
Utah Power & Light Co. 36, 37

Wagner Electric Corp. 27
Washington Water Power Co. 36, 37
Westinghouse Elec. & Mfg. Co., East Pittsburgh 17, 18
Weston Elec'l Instrument Corp. 80
Wiegand Co., Edwin L. 19

PROFILES OF THE MONTH

Howard Peterson, Peterson Co., Denver, has been named sales agent for Weston Electrical Instrument Corp., covering six western states

J. F. O'Donnell, asst. sales manager, Westinghouse merchandising division, has been appointed to direct division's Pacific Coast operations

Mrs. Thomas A. Edison, widow of the famous inventor, is presented with a replica of the first incandescent lamp by Robt. Smallman, General Electric, at the G-E exhibit on Treasure Island

F. C. Burchette, Silver State Appliance Co., Reno, has recently been named Kelvinator distributor and dealer for Nevada. Mrs. Burchette serves as the vice-president and treasurer

Standing in front of a recently completed, Red Seal wired home in San Francisco are Carl Gellert, president Standard Building Co.; J. R. Lazarus, PCEA; Melvin S. Springer, owner; Robert Lindsay, PG and E; Frank Talcott, sales mgr., S. F. division, PG and E, and J. R. Rentz, Standard Bldg. Co.

GAS AND ELECTRIC RATES

Saving TO OUR CUSTOMERS

know that P. G. and E. rates have long been among the lowest in the nation. Now—this month—they are to be lower still! Electric rates are being cut $2,000,000 per year; gas rates, $3,000,000. The accumulated saving since 1928 is thereby increased to $33,510,000—or enough to build another Golden Gate Bridge.

Consider not only the amount of these savings, but how they were accomplished. First, by successful load building; secondly, by the continuous application of new efficiencies and economies in the Company's operations.

We like to point out, too, that these reductions are not local but regional in character—affecting nearly every part of our far-flung system.

11th

in a series of rate and cost reductions since 1928.

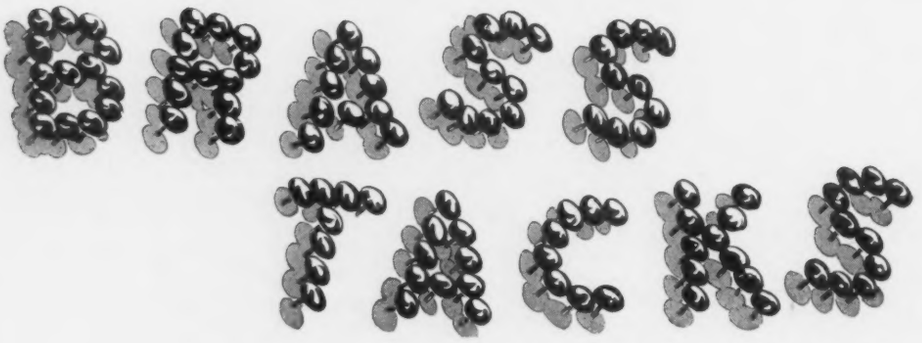
$33,510,000

combined yearly savings to gas and electric users compared to rates in effect in February, 1928.

GAS and ELECTRICITY ARE CHEAPER in California

PACIFIC GAS AND ELECTRIC COMPANY

Getting down to



about this

ADEQUATE WIRING STORY

You are in the electrical business to make your living.

Adequate wiring is the key to the prosperity of the electrical business—to the prosperity of YOUR business.

In a world full of inadequately wired buildings, every man in the electrical industry can directly benefit himself by spreading this adequate wiring story.

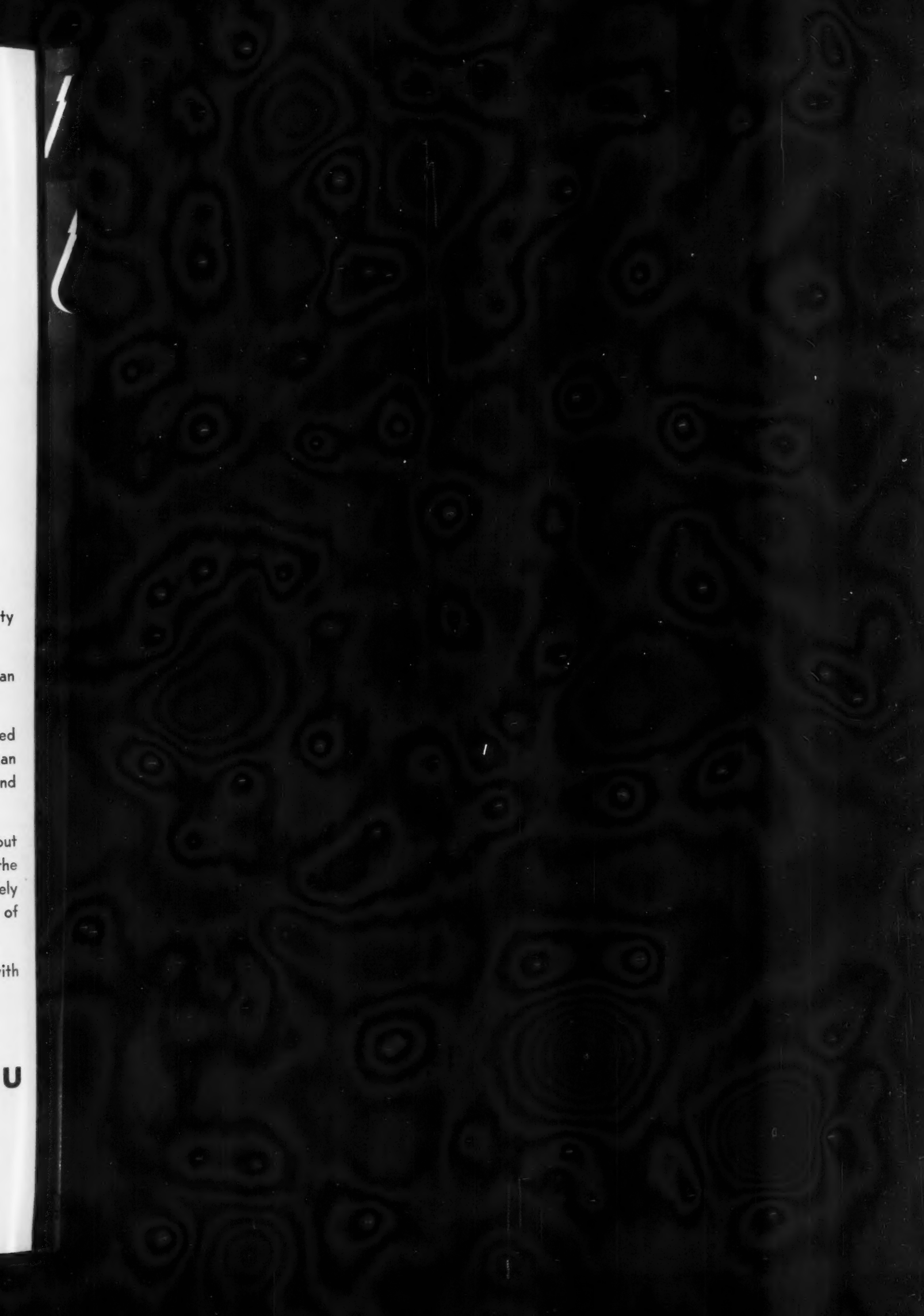
You don't have to wait for some rosy future when all buildings are completely electrified —there's more prosperity for you RIGHT NOW in selling this adequate wiring story than there will ever be when every home and every commercial building is superbly wired and equipped.

Wiring may not be your business, but it should be good business for you to talk about it at every opportunity. See to it that every customer and every friend of yours is sold on the need for adequate wiring—that every new home you have anything to do with is adequately wired—that every home remodeled in your district is rewired to modern standards of adequacy.

Talk wiring, write wiring, sell wiring. Back up the general publicity and advertising with your personal work in your locality.

PACIFIC COAST ELECTRICAL BUREAU

601 WEST 5TH STREET LOS ANGELES • 447 SUTTER STREET, SAN FRANCISCO

CERTIFIED ADEQUATE RED SEAL STANDARD WIRING

10-40